

BIOCHEMISTRY 401

Gene Expression in Eukaryotes CRN 20253

Course Outline: Spring 2020

LOCATION & TIME: COR B112, MR 10:00-11:20 am

INSTRUCTORS:

Dr. Chris Nelson
Office: Petch
Office hours: Wednesdays 1-3pm
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Dr. Paul Romaniuk
Office: Petch 223b
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Dr. Perry Howard
Office: Petch 207
Office hours: MR 3:00 -4:00 pm
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TOPICS: Biochemistry 401 is an advanced study of gene expression in eukaryotes. Topics include gene structure, eukaryotic transcription, transcriptional regulation and post-transcriptional processing with special emphasis on transcription factors and RNA dynamics with a discussion of the current literature highlighting the role of gene expression in disease and development. The course is delivered in three parts which will conform approximately to the attached course outline, however some changes are possible.

PART 1: Dr. Nelson January 6 – January 30

The RNA polymerase machinery and the regulation of gene activation including transcriptional initiation, elongation and spatial aspects of transcription.

| Date | Topic | assessment | % of total mark |
|-------------|--|--------------------|------------------------|
| Jan 6 | Introduction, polymerases and perspectives | | |
| 9 | The DNA template and transcription factors | Reading quiz | 3% |
| 13 | Principles of Regulation | | |
| 16 | Principles of Regulation | Group assignment 1 | 5% |
| 20 | Initiation | | |
| 23 | Elongation | Group assignment 2 | 5% |
| 27 | Location | | |
| 30 | | Test | 20% |

PART 2: Dr. Romaniuk, February 3 – March 5

Coordinated, co-transcriptional processing including splicing and termination, RNA export, RNA turnover in the nucleus. There will be an overview of each topic listed. There will be a research paper assigned on that topic with a quiz on the paper at the start of the next lecture.

| Date | Topic | assessment | % of total mark |
|-------|-------------------------------------|------------------|-----------------|
| Feb 3 | Coordinating txn and RNA processing | | |
| 6 | Pre-mRNA splicing | reading quiz 1 | 2% |
| 10 | alternative splicing | reading quiz 2 | 2% |
| 13 | aberrant splicing and disease | reading quiz 3 | 2% |
| | | | |
| 24 | group assignment #3 – splicing | group assignment | 10% |
| 27 | RNA export | reading quiz 4 | 2% |
| Mar 2 | nuclear RNA turnover | reading quiz 5 | 2% |
| 5 | Class test | class test 2 | 14% |

PART 3: Dr. Howard, March 9- April 2

Non-coding RNAs, nonsense mediated decay, RNA phase transition in cytosol, translation (time permitting)

Grading:

| Date | topic | assessment | % total mark |
|-------|-----------------------------------|----------------------|--------------|
| Mar 9 | miRNA biogenesis | | |
| 12 | miRNA roles | | |
| 16 | Group assignment #4 | Group assignment | 4% |
| 19 | Nonsense mediated decay+NMD roles | | |
| 23 | Phase transitions + Quiz 6 | Quiz 6 | 10% |
| 26 | Translation+ assignment | Take-home assignment | 4% |
| 30 | Translation regulation | | |
| Apr 2 | Test 3 | Class test 3 | 15% |

UVic Grading Scheme

| | | | | | | | |
|----------------------|---------|----------------------|---------|----------------------|---------|-------------|------|
| A⁺ | 90 -100 | B⁺ | 77 - 79 | C⁺ | 65 - 69 | F | < 50 |
| A | 85 - 89 | B | 73 - 76 | C | 60 - 64 | N ** | < 50 |
| A⁻ | 80 - 84 | B⁻ | 70 - 72 | D | 50 - 59 | | |

**** N grades**

Students who have completed the following elements will be considered to have completed the course and will be assigned a final grade:

- *one of Group Assignments 1 and 2 (Jan 16/23)*
- *Test 1 (Jan 30)*
- *Group Assignment 3 (Feb 24)*
- *Test 2 (March 5)*
- *Quiz 6 (Mar 23)*
- *Test 3 (April 2).*

Failure to complete one or more of these elements will result in a grade of “N” regardless of the cumulative percentage on other elements of the course. An N is a failing grade, and it factors into a student’s GPA as 0. The maximum percentage that can accompany an N on a student’s transcript is 49.

DEPARTMENT INFORMATION AND POLICIES

1. The Department of Biochemistry and Microbiology upholds and enforces the University’s policies on academic integrity. These policies are described in the current University Calendar. All students are advised to read this section.
2. Cell phones, computers, and other electronic devices must be turned off at all times unless being used for a purpose relevant to the class. Students having a cell phone, tablet, or computer on their person during an exam will be assumed to have it for the purpose of cheating.
3. Any recordings of lectures may only be performed with written permission of the instructor, and are for personal use only. The instructor retains copyright to such recordings and all lecture materials provided for the class (electronic and otherwise); these materials must not be shared or reposted on the Internet.
4. Course materials, such as notes, problem sheets, quizzes, examinations, example sheets, or review sheets, may not be redistributed without the explicit written permission of the instructor.
5. Students are expected to be present for the midterm and final exams. Instructors may grant deferrals for midterm examinations for illness, accident, or family affliction, and students must provide appropriate documentation 48 hours after the midterm exam. The Department

of Biochemistry and Microbiology considers it a breach of academic integrity for a student taking a deferred examination to discuss the exam with classmates. Similarly, students who reveal the contents of an examination to students taking a deferred examination are considered to be in violation of the University of Victoria policy on academic integrity (see current University Calendar). Deferral of a final exam must be requested with an Academic Concession form and submitted directly to Undergraduate Records. Deferred final exams for fall term courses will be arranged by the instructor. Deferred final exams for spring term courses will be arranged through Undergraduate Records and must be written before the end of the summer term as stipulated in the University Calendar.

6. Multiple choice scan sheets for machine scoring (bubble sheets) are considered the authentic exam answer paper and will be retained by the department for 1 year.
7. Professors may refuse to review/remark exams not written in indelible ink. In addition, requests for review/remark of a midterm exam must be made within one week of the exam being returned. Students are expected to promptly pick up midterm exams after marking has been completed, either in class or from the instructor.
8. Examination papers that have pages removed, or are mutilated will not be marked.
9. The instructor reserves the right to use plagiarism detection software or other platforms to assess the integrity of student work.
10. Supplemental exams or assignments will not be offered to students wishing to upgrade their final mark.
11. Students who miss an assignment or quiz without providing appropriate documentation, as described in item 5 above, will be receive a grade of zero for that component of the course.

Centre for Accessible Learning

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, approach the Centre for Accessible Learning (CAL) as soon as possible in order to assess your specific needs.

<https://www.uvic.ca/services/cal/index.php>

Course Experience Survey (CES)

We value your feedback on this course. Towards the end of term you will have the opportunity to complete a confidential course experience survey (CES) regarding your learning experience. The survey is vital to providing feedback to me regarding the course and my teaching, as well

as to help the department improve the overall program for students in the future. When it is time for you to complete the survey, you will receive an email inviting you to do so. If you do not receive an email invitation, you can go directly to your [CES dashboard](#). You will need to use your UVic NetLink ID to access the survey, which can be done on your laptop, tablet or mobile device. I will remind you nearer the time but please be thinking about this important activity.