

BIOCHEMISTRY 408 – Chromatin & Epigenetics
Course Outline: Spring 2016

Place: Elliot 061
Time: Tuesday, Wednesday, Friday: 8:30 am - 9:20 am
Textbook: None
Web site: CourseSpaces

Instructors: **Dr. Juan Ausió (Jan 5-8; Feb 26-April 1)**, Office: Petch 260;
Email: jausio@uvic.ca Office hours: 9:00am-5:00pm *
Dr. Chris Nelson (Jan 12 – Feb 24) Office: Petch 270b;
Email: cjn@uvic.ca Office hours: W 1:30-3:30pm *
(or by appointment)

* No office hours will be offered the day before an exam.

Course Description

BIOC 408 introduces students to the properties of chromatin and molecular mechanisms underlying epigenetic inheritance. The course is heavily focused on primary research papers that utilize a diversity of model organisms to demonstrate the contributions of epigenetics to development and disease. The course requires a familiarization with nucleic acid and protein chemistry; therefore, students should be familiar with the fundamental aspects of transcription and gene structure. Students should also review basic cell biology in preparation for this course. Students must complete BIOC 300B before taking BIOC 408.

Format

The course consists of *formal lectures* that introduce essential background material, and key concepts in Chromatin and Epigenetics. There is a strong emphasis on the understanding of experimental methods and their application to test hypotheses. Each lecture will conform approximately to the attached course outline, however some changes are possible. Students are responsible for the lecture material and *Companion papers* in examinations.

Companion papers are assigned to the class to compliment the lecture material. In some cases, these papers will be accompanied with questions to encourage students to fully understand data, and the utility of experimental methods. These questions are not marked, but the content of companion papers makes up 25% of exam questions (ie. 10% of the final grade).

Group presentations will take place twice during the course (see outline). These ~40 min presentations will summarize a group's work in investigating a recent publication that advances the understanding of Chromatin and Epigenetics to the class. Group composition and further details of this exercise will be announced in class.

Evaluation and marking policy

There will be two exams. The first covers material from Jan 5th to Feb 17th and will be held on Feb 26th outside of regular class time. It is worth 40% of the final grade, and there will be no lecture on this date. The second exam, covering material from Feb 26th to April 1th, will be held during the final exam period and is also worth 40% of the final grade. Students are expected to thoroughly read and understand companion papers as 25% of exam questions will be focused on this material. The mark breakdown is thus as follows:

Nelson Exam	40
Ausio Exam	40
Group Presentations	15
Class Participation	<u>5</u>
TOTAL	100

Lecture Content: Chromatin & Epigenetics Course Outline:

Week	Instructor	Date	Topic
1	Ausio	Jan. 5	The basic structural proteins of chromatin
1	Ausio	6	Histones
1	Ausio	8	Histone post-translational modifications
2	Nelson	12	Introduction to Epigenetics
2	Nelson	13	The stochastic nature of heterochromatin
2	Nelson	15	Histone modifications of euchromatin I
3	Nelson	19	Histone modifications of euchromatin II
3	Nelson	20	Enhancers
3	Nelson	22	Histone modifications of heterochromatin I
4	Nelson	26	Histone modifications of heterochromatin II
4	Nelson	27	DNA methylation I
4	Nelson	29	DNA methylation II
5	Nelson	Feb. 2	DNA methylation and cancer
5	Nelson	3	Genome Organization I
5	Nelson	5	Genome Organization II
		Feb. 8-12	Reading Break
6	Nelson	16	Environment-Epigenome interactions I
6	Nelson	17	Group Presentations A
6	Nelson	19	Group Presentations B
7	Nelson	23	Group Presentations C
7	Nelson	24	Review
7	Nelson	26	Exam 1 (40%)
8	Ausio	Mar. 1	Histone structure and interactions
8	Ausio	2	Nonhistone chromosomal proteins
8	Ausio	3	The nucleosome
9	Ausio	8	The structure of the nucleosome I
9	Ausio	9	The structure of the nucleosome II
9	Ausio	11	The chromatin fiber I
10	Ausio	15	The chromatin fiber II
10	Ausio	16	The chromatin fiber III
10	Ausio	18	The fundamental characteristics of transcriptionally active chromatin
11	Ausio	22	The basic structural organization of interphase and metaphase chromatin
11	Ausio	23	Group Presentations D
11		25	Good Friday
12	Ausio	29	Group Presentations E
12	Ausio	30	Group Presentations F
12	Ausio	Apr. 1	Review
		TBA	Exam 2 (40%)

Conversion of Marks to Final Letter Grades: Total marks from exams and assignments will be calculated, weighted and converted to a percentage and letter grade as follows:

Grades	Grade Point Value	Percentage	Description
A+ A A-	9 8 7	90 – 100 85 – 89 80 – 84	Exceptional, outstanding and excellent performance. Normally achieved by a minority of students. These grades indicate a student who is self-initiating, exceeds expectation and has an insightful grasp of the subject matter.
B+ B B-	6 5 4	77 – 79 73 – 76 70 – 72	Very good, good and solid performance. Normally achieved by the largest number of students. These grades indicate a good grasp of the subject matter or excellent grasp in one area balanced with satisfactory grasp in the other area.
C+ C	3 2	65 – 69 60 – 64	Satisfactory, or minimally satisfactory. These grades indicate a satisfactory performance and knowledge of the subject matter.
D	1	50 – 59	Marginal Performance. A student receiving this grade demonstrated a superficial grasp of the subject matter.
F	0	0-49	Unsatisfactory performance. Wrote final examination and completed course requirements; no supplemental.
N	0	0-49	Did not write examination or complete course requirements by the end of term or session; no supplemental. Failure to complete one or more components of student evaluation 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 O. 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. 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.
5. Scan sheets for multiple choice exams (bubble sheets) will not be made available for review. Therefore, in addition to filling in answers on the scan sheet, students should also circle their answers in ink on their exam.
6. Professors may refuse to review/remark exams not written in 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.
7. Examination papers that have pages removed, or are mutilated will not be marked.