BIOCHEMISTRY 408 – Chromatin & Epigenetics
Course Outline: **Spring 2017**

Place: **Elliot 162**
Time: Tuesday, Wednesday, Friday: 8:30 am - 9:20 am
Textbook: None
Web site: CourseSpaces

Instructors: **Dr. Juan Ausió (Jan 4-10; Feb 10 - April 4)**
Email: jausio@uvic.ca
Office: Petch 260
Office hours: 9:00am-5:00pm *

Dr. Chris Nelson (Jan 11-Feb8; Mar 17-April 4)
Email: cjn@uvic.ca
Office: Petch 270b
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. These papers will be the subject of discussion in Group Work sessions (see course outline), and will be accompanied with a set of assignment questions that encourage students to fully understand the data, and the utility of experimental methods. A portion of the questions will be marked and make up the Discussion Group Assignment Grade.

Group presentations will take place at the end of the course (Mar22-April 4). These 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 presentation guidelines will be announced in class.

Evaluation and marking policy

There will be two exams. The first covers material from Jan 4th to Feb 3rd and will be held on Feb 8th outside of regular class time. It is worth 30% of the final grade, and there will be no lecture on this date. The second exam, covering material from Feb 7th to Mar 21st, will be held during the final exam period and is worth 40% of the final grade. Students are expected to thoroughly read and understand companion papers as approximately 25% of exam questions will be focused on this material. The mark breakdown is thus as follows:

Discussion Group Assignments (Jan 20, 27, Feb 3)	10
Mid-term Exam (Feb 8th)	30
Group Presentations	15
Class Participation	5
Final Exam	40
TOTAL	**100**

Lecture Content: Chromatin & Epigenetics Course Outline:

Week	Instructor	Date	Topic
1	Ausio/Nelson	Jan. 4	Introduction to Epigenetics & Chromatin
1	Ausio	6	The basic structural proteins of chromatin
2	Ausio	10	Histone post-translational modifications (PTMs)
2	Nelson	11	The stochastic nature of heterochromatin
2	Nelson	13	**Sperling paper discussion*
3	Nelson	17	Histone modifications of euchromatin I
3	Nelson	18	Histone modifications of euchromatin II
3	Nelson	20	**Group work: Du et al paper questions*
4	Nelson	24	Histone modifications of heterochromatin I
4	Nelson	25	Histone modifications of heterochromatin II
4	Nelson	27	**Group work: Margeron paper questions*
5	Nelson	31	DNA methylation I
5	Nelson	Feb. 1	DNA methylation II
5	Nelson	3	**Group work: [DNA methylation paper TBA] questions*
6	Nelson	7	3D Genome Organization
6	Nelson	8	**Exam outside class time (30%)**
6	Ausio	10	Structural implications of histone variants (PAPER 1)
		Feb. 13-17	**Reading Break**
7	Ausio	21	Histone structure and interactions
7	Ausio	22	Nonhistone chromosomal proteins
7	Ausio	24	The nucleosome
8	Ausio	28	Structure of the nucleosome I
8	Ausio	Mar.1	Structure of the nucleosome II (PAPER 3)
8	Ausio	3	The chromatin fiber I
9	Ausio	7	The chromatin fiber II
9	Ausio	8	The chromatin fiber III
9	Ausio	10	The fundamental characteristics of transcriptionally active chromatin (PAPER 4)
10	Ausio	14	The basic structural organization of interphasic and metaphasic chromatin
10	Ausio	15	The basic structural organization of interphasic and metaphasic chromatin
10	Nelson	17	Environment-Epigenome interactions I
11	Nelson	21	Environment-Epigenome interactions II
11	Ausio/Nelson	22	Group Presentations
11	Ausio/Nelson	24	Group Presentations
12	Ausio/Nelson	28	Group Presentations
12	Ausio/Nelson	29	Group Presentations
12	Ausio/Nelson	31	Group Presentations
	Ausio/Nelson	April. 4	Group Presentations
		TBD	**Final Exam (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:

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
Only students who have completed i) the Mid-term Exam, ii) a Group Presentation, and iii) the Final Exam, will be considered to have completed the course and will be assigned a final grade.

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."