**CSB 457H1S – POST-TRANSCRIPTIONAL GENE REGULATION**

12L 24S

**Lecturer:**

Prof. John Calarco john.calarco@utoronto.ca

**Prerequisites:** Minimum grade of 70% in BCH311H1/ CSB349H1/ MGY311Y1

This course focuses on advances in post-transcriptional gene regulation. Topics covered will include regulatory RNAs, RNA processing, localization, translation, and degradation. In addition to lectures from the instructor covering background material, emphasis is placed on current research and will involve discussion of primary literature in a round-table format.

The course is composed of the following elements:

**Lecture Period:** Standard lectures to provide relevant background information based on current review articles. For each lecture, one review article and one primary research paper will be assigned to students corresponding to the topic covered in the lecture. All assigned papers for the entirety of the course will be made available to students at the beginning of the course.

**Round-Table Discussion Periods:** Students are split into groups of three. Eight specific questions are provided on Blackboard for the primary research paper assigned. Students must be prepared to answer all of the questions before class. At the beginning of class, one group is randomly chosen to answer the first question, and then we continue around the room answering the remaining questions (~5min for answers and discussion per question).

**Office hours:** The second hour of round-table discussion day

**Evaluation:**

Mid-term exam (in-class, week 7, covers weeks1-6) 30%

Final exam (covers weeks 8-12) 30%

Quiz 1 in week 4 (covers weeks 1-3) 7.5%

Quiz 2 in week 10 (covers weeks 8-10) 7.5%

Participation in round-table discussions 25%

The midterm will be based on all lectures and papers covered in weeks 1-6 and the final exam will be based on all lectures and papers covered in weeks 8-12. There will also be two 15-minute quizzes, one in week 4 and one in week 10, prior to the round table discussion for that week.

**Topics covered:**

Week 1: Overview of course, CRISPR editing paper

Week 2: Techniques in RNA biology I

Week 3: Techniques in RNA biology II

Week 4: Liquid-Liquid phase separation (and quiz 1)

Week 5: Alternative splicing - mechanisms

Week 6: Cleavage and Polyadenylation

Week 7: Alternative splicing – consequences for the cell (Mid-Term Exam (in class))

Week 8: RNA export and localization

Week 9: Translation regulation

Week 10: RNA decay (and quiz 2)

Week 11: RNA editing

Week 12: non-coding RNAs