BIOM555 - REGULATION OF THE GENOME: SPRING 2023

COURSE INFORMATION

Lectures: Tuesdays and Thursdays: 8:30 am – 10:00 am; Tuesday, January 17 through Thursday, April 27. Classes are in person in the Austrian Auditorium of CRB, unless otherwise noted.

Small group discussions: **Thursday, January 26 through Friday April 21**. Students choose one discussion session and attend that session each week. Attendance and participation are required.

Session 1: Thursdays	10:00a–11:00a	Room 1403 BRB	Gaby
Session 2: Thursdays	10:00a–11:00a	Room 801 BRB	Andy
Session 3: Thursdays	3:30p–4:30p	Room 801 BRB	Sarah O
Session 4: Thursdays	3:30p–4:30p	Room 1101 BRB	Beth
Session 5: Fridays	11:00a–12:00p	Room 801 BRB	Sean
Session 6: Fridays	11:00a–12:00p	Room 301 BRB	Sheridan
Session 7: Fridays	3:30p–4:30p	Room 1001 BRB	Sarah G
Session 8: Fridays	3:30p–4:30p	Room 701 BRB	Megan

Exams: There will be three exams, Februray 21, March 28, and April 27 from 8:00 am – 10:00 am. Exams will be taken on Canvas in presence of the TA's. The exams will be in "open note" format. You can bring and consult your notes from class but not use textbooks or the internet.

Final grade: The final grade for the course is a composite of the three exams, each counting for 25%, and a grade given by the TA's for class participation during the small group discussions, which counts for the remaining 25%. Final scores ≥ 90 will be given an "A", between 80 and 89.9 a "B", and scores below 80 a B- or a C. In prior years, the mean final score was ~ 87 and the median ~88. Should this year's mean and median be significantly lower, the course directors will consider adjustments to the grading scheme in favor of the class.

Office hours: There are no formal office hours. The course directors and TA's will answer questions and concerns about the course after the lectures or during the small group discussions.

Course Directors:
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BGS Course Coordinator:
Colleen Dunn: dunncoll@pennmedicine.upenn.edu; 898-2792; 160 BRB II/III

LECTURE SCHEDULE

Section 1 – Genome maintenance

Tuesday, January 17: Course outline & introduction to next generation sequencing (Roberto Bonasio)
Thursday, January 19: DNA replication (Paul Lieberman)

Tuesday, January 24: Telomeres (Roger Greenberg)
Thursday, January 26: DNA repair and cell cycle checkpoints (Roger Greenberg)
Thursday/Friday (Discussion of problem set 1: DNA replication and telomeres)

Tuesday, January 31: Genome Editing (Jorge Henao-Mejia)

Section 2 – Transcription

Thursday, February 2: Transcriptomics ad epigenomics (Klaus Kaestner)
Thursday/Friday (Discussion of problem set 2: DNA repair and Genome editing)

Tuesday, February 7: Eukaryotic transcription I – (Ken Zaret)
Thursday, February 9: Eukaryotic transcription II – (Ken Zaret)
Thursday/Friday (Discussion of problem set 3: Genomic methods & transcription I)

Tuesday, February 14: Nucleosome structure (Ronen Marmorstein)
Thursday, February 16: REVIEW SESSION FOR EXAM (TAs)
Thursday/Friday (Discussion of problem set 4: Transcription II & nucleosome)

Section 3 – Histones

Tuesday, February 21: **EXAM 1**; Smilow Auditorium – 8:00 am – 10:00 am
Thursday, February 23: Histone marks (Roberto Bonasio)

Tuesday, February 28: Polycomb (Roberto Bonasio)
Thursday, March 2: Trithorax and chromatin remodeling (Roberto Bonasio)
Thursday/Friday (Discussion of problem set 4: Histone modifications & Polycomb)

Section 4 – DNA modifications and 3D organization

Tuesday, March 7: Spatial genomics methods: sequencing and imaging (Eric Joyce)
Thursday, March 9: Chromatin topology and nuclear organization (Eric Joyce)
Thursday/Friday (Discussion of problem set 5: Trithorax & spatial genomic methods)

Tuesday, March 14: DNA modifications (Marisa Bartolomei)
Thursday, March 16: Genomic imprinting and dosage compensation (Marisa Bartolomei)
Thursday/Friday (Discussion of problem set 6: Nuclear organization and DNA modifications)

Tuesday, March 21: Transposable elements (Andrew Modzelewski)
Thursday, March 23: REVIEW SESSION FOR EXAM (TAs)
Thursday/Friday (Discussion of problem set 7: Imprinting & transposable elements)

Section 5 – Coding and noncoding RNA regulation

Tuesday, March 28: **EXAM 2**; Smilow Auditorium – 8:00 am – 10:00 am
Thursday, March 30: Long non-coding RNAs (Montserrat Anguera)

Tuesday, April 4: Small RNAs and RNA interference (Colin Conine)
Thursday, April 6: RNA processing (Kristen Lynch)

Thursday/Friday (Discussion of problem set 8: Noncoding RNAs)

Tuesday, April 11: RNA modifications (Kristen Lynch)
Thursday, April 13: RNA localization (Peter Klein)
Thursday/Friday (Discussion of problem set 9: RNA processing and modifications)

Tuesday, April 18: Translational control (Peter Klein)
Thursday, April 20: Transgenerational epigenetics & course conclusion (Roberto Bonasio)
Thursday/Friday (Discussion of problem set 10: RNA localization and translational control)

Tuesday, April 25: REVIEW SESSION FOR EXAM (TAs)
Thursday, April 27: **EXAM 3**; Class of 62 and Reunion Auditoriums – 8:00 am – 10:00 am

General references for review (library/web)
Lewin's Genes XII (Krebs, Goldstein, Kilpatrick)
Epigenetics, 2nd edition (Allis, Jenuwein, Reinberg)

Email addresses for lecturers

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Good research practices: BGS requires its doctoral students to be trained in i) Responsible Conduct of Research (RCR), and ii) Scientific Rigor and Reproducibility (SRR) (https://www.med.upenn.edu/bgs-rcr-exdes/). Course content is designed to complement RCR and SRR efforts.