
COURSE INFORMATION

Lectures: Tuesdays and Thursdays: 8:30 am – 10:00 am; Thursday, January 16 through Tuesday, April 22. Classes are in person in the Austrian Auditorium of CRB.

Small group discussions: **Thursday, January 23 through Friday April 25.** Students choose one discussion session and attend that session each week. Attendance and participation are required.

Session 1: Thursdays	10:00 am – 11:00 am	TBA; Thursdays 10–11 am in 701 BRB
Session 2: Thursdays	10:00 am – 11:00 am	TBA; Thursdays 10–11 am in 801 BRB
Session 3: Thursdays	3:30 pm – 4:30 pm	TBA; Thursdays 3:30–4:30 pm in 801 BRB
Session 4: Thursdays	3:30 pm – 4:30 pm	TBA; Thursdays 3:30–4:30 pm in 501 BRB
Session 5: Fridays	11:00 am – 12:00 pm	TBA; Fridays 11–12 noon in 801 BRB (301 BRB on Apr25)
Session 6: Fridays	11:00 am – 12:00 pm	TBA; Fridays 11–12 noon in 1413 BRB
Session 7: Fridays	3:30 pm – 4:30 pm	TBA; Fridays 3:30–4:30 pm in 301 BRB
Session 8: Fridays	3:30 pm – 4:30 pm	TBA; Fridays 3:30–4:30 pm in 701 BRB

Exams: There will be three exams, February 20, March 27, and April 29 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, the internet, or any form of AI.

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 the mean and median be significantly lower this year, the course director will consider adjustments to the grading scheme in favor of the class.

Office hours: The course director and TA's will answer questions and concerns about the course after the lectures or during the small group discussions.

Course Director:

Roberto Bonasio: roberto@bonasiolab.org

Teaching Assistants:

Maggie Cassidy	:	Maggie.Cassidy@pennmedicine.upenn.edu
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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

Thursday, January 16: Course outline & introduction to next generation sequencing (Roberto Bonasio)

Tuesday, January 21: DNA replication (Eric Brown)

Thursday, January 23: Telomeres (Roger Greenberg)

[Thursday/Friday \(Discussion of problem set 1: NGS, DNA replication\)](#)

Tuesday, January 28: DNA repair and cell cycle checkpoints (Roger Greenberg)

Thursday, January 30: Genome editing and functional genomics (Ophir Shalem)

[Thursday/Friday \(Discussion of problem set 2: telomeres and DNA repair\)](#)

Section 2 – Transcription

Tuesday, February 4: Eukaryotic transcription I (Ken Zaret)

Thursday, February 6: Eukaryotic transcription II (Ken Zaret)

[Thursday/Friday \(Discussion of problem set 3: Genome editing & transcription I\)](#)

Tuesday, February 11: Nucleosome structure (Ben Black)

Section 3 – Histones

Thursday, February 13: Transcriptomics and epigenomics (Klaus Kaestner)

[Thursday/Friday \(Discussion of problem set 4: Transcription II & nucleosomes\)](#)

Tuesday, February 18: REVIEW SESSION FOR EXAM (TAs)

Thursday, February 20: **EXAM 1**; BRB auditorium – 8:00 am – 10:00 am

Tuesday, February 25: Histone marks (Roberto Bonasio)

Thursday, February 27: Polycomb (Roberto Bonasio)

[Thursday/Friday \(Discussion of problem set 5: Transcriptomics, epigenomics & histone marks\)](#)

Tuesday, March 4: Trithorax and chromatin remodeling (Roberto Bonasio)

Section 4 – DNA modifications and 3D organization

Thursday, March 6: Methods to study the genome in 3D (Eric Joyce)

[Thursday/Friday \(Discussion of problem set 6: Polycomb & trithorax\)](#)

Tuesday, March 11: Chromatin topology and nuclear organization (Eric Joyce)

Thursday, March 13: Long non-coding RNAs (Montserrat Anguera)

[Thursday/Friday \(Discussion of problem set 7: 3D genome & chromatin topology\)](#)

Tuesday, March 18: DNA modifications (Marisa Bartolomei)

Thursday, March 20: Genomic imprinting and dosage compensation (Marisa Bartolomei)

[Thursday/Friday \(Discussion of problem set 8: lncRNAs & DNA modifications\)](#)

Tuesday, March 25: REVIEW SESSION FOR EXAM (TAs)

Thursday, March 27: **EXAM 2**; Smilow auditorium – 8:00 am – 10:00 am

Tuesday, April 1: Transposable elements (Andrew Modzelewski)

Section 5 – Coding and noncoding RNA regulation

Thursday, April 3: RNA processing (Kristen Lynch)

[Thursday/Friday \(Discussion of problem set 9: Imprinting & transposons\)](#)

Tuesday, April 8: RNA modifications (Kristen Lynch)

Thursday, April 10: Small RNAs and RNA interference (Colin Conine)

[Thursday/Friday \(Discussion of problem set 10: RNA processing & modifications\)](#)

Tuesday, April 15: Translational control (Peter Klein)

Thursday, April 17: RNA stability and localization (Peter Klein)

[Thursday/Friday \(Discussion of problem set 11: Small RNAs & translational control\)](#)

Tuesday, April 22: Transgenerational epigenetics & course conclusion (Roberto Bonasio)

Thursday, April 24: REVIEW SESSION FOR EXAM (TAs)

[Thursday/Friday \(Discussion of problem set 12: RNA stability & transgenerational epigenetics\)](#)

Tuesday, April 29: **EXAM 3**; Smilow auditorium – 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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Ken Zaret: zaret@penntmedicine.upenn.edu

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.

COVID-19 policy: There are no longer University-wide mandates, but we kindly request that if you are sick you take a good rest and consider watching the lectures and joining the small group session remotely. If you must participate in person while sick, please wear a good mask.

Policy on chatGPT use (and other LLMs): just don't.