
COURSE INFORMATION

Lectures: Tuesdays and Thursdays: 8:30 am – 10:00 am; Thursday, January 15 through Tuesday, April 21. Classes are in person in the Austrian Auditorium of CRB.

Small group discussions: **Thursday, January 22 through Friday April 24.** Students choose one discussion session and attend that session each week. Attendance and participation are required.

Exact days/times and locations of Small Group Discussions TBD

Session 1: Thursdays	10:00 am – 11:00 am
Session 2: Thursdays	10:00 am – 11:00 am
Session 3: Thursdays	10:00 am – 11:00 am
Session 4: Thursdays	3:30 pm – 4:30 pm
Session 5: Thursdays	3:30 pm – 4:30 pm
Session 6: Fridays	11:00 am – 12:00 pm
Session 7: Fridays	11:00 am – 12:00 pm
Session 8: Fridays	3:30 pm – 4:30 pm

Exams: There will be three exams, February 19, March 26, and April 28 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 participation in the small group discussions, which counts for the remaining 25%. Final scores ≥ 90 correspond to A/A+, 80–89.9 to B, < 80 to B- or C. Typically, the mean final score is ~ 90 . Should it 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

Assistant Director:

Kurt Engleka: kengleka@penndmedicine.upenn.edu

Teaching Assistants:

TBD

BGS Course Coordinator:

Colleen Dunn: dunncoll@penndmedicine.upenn.edu; 898-2792; 160 BRB II/III

LECTURE SCHEDULE

Section 1 – Genome maintenance

Thursday, January 15: Course outline & introduction to next generation sequencing (Roberto Bonasio)

Tuesday, January 20: DNA replication (Eric Brown)

Thursday, January 22: Telomeres (Roger Greenberg)

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

Tuesday, January 27: DNA repair and cell cycle checkpoints (Roger Greenberg)

Thursday, January 29: Genome editing and functional genomics (Ophir Shalem)

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

Section 2 – Transcription & nucleosomes

Tuesday, February 3: Eukaryotic transcription I (Ken Zaret)

Thursday, February 5: Eukaryotic transcription II (Ken Zaret)

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

Tuesday, February 10: Nucleosome structure (Ben Black)

Thursday, February 12: Transcriptomics and epigenomics (Klaus Kaestner)

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

Tuesday, February 17: REVIEW SESSION FOR EXAM (TAs)

Thursday, February 19: **EXAM 1**; Location TBD – 8:00 am – 10:00 am

Section 3 – Histone marks

Tuesday, February 24: Histone marks (Roberto Bonasio)

Thursday, February 26: Polycomb (Roberto Bonasio)

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

Tuesday, March 3: Trithorax and chromatin remodeling (Roberto Bonasio)

Section 4 – DNA modifications and 3D organization

Thursday, March 5: Methods to study the genome in 3D (Eric Joyce)

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

Tuesday, March 10: Chromatin topology and nuclear organization (Eric Joyce)

Thursday, March 12: Long non-coding RNAs (Montserrat Anguera)

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

Tuesday, March 17: DNA modifications (Marisa Bartolomei)

Thursday, March 19: Genomic imprinting and dosage compensation (Marisa Bartolomei)

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

Tuesday, March 24: REVIEW SESSION FOR EXAM (TAs)

Thursday, March 26: **EXAM 2**; Location TBD – 8:00 am – 10:00 am

Tuesday, March 31: Transposable elements (Andrew Modzelewski)

Section 5 – Coding and noncoding RNA regulation

Thursday, April 2: RNA processing and modification (Kristen Lynch)

Thursday/Friday (Discussion of problem set 9: Imprinting & transposons)

Tuesday, April 7: Regulation of RNA processing (Kristen Lynch)

Thursday, April 9: Small RNAs and RNA interference (Colin Conine)

Thursday/Friday (Discussion of problem set 10: RNA processing & modifications)

Tuesday, April 14: Translational control (Peter Klein)

Thursday, April 16: RNA stability and localization (Peter Klein)

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

Tuesday, April 21: Transgenerational epigenetics & course conclusion (Roberto Bonasio)

Thursday, April 23: REVIEW SESSION FOR EXAM (TAs)

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

Tuesday, April 28: **EXAM 3**; Location TBD – 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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Peter Klein: pklein@pennmedicine.upenn.edu

Kristen Lynch: klync@pennmedicine.upenn.edu

Andrew Modzelewski: amodz@vet.upenn.edu

Ophir Shalem: shalemo@pennmedicine.upenn.edu

Ken Zaret: zaret@pennmedicine.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.