

# Epigenetics and Human Disease

PCB4562

3 credits

**Prerequisites:** A grade of "C" or better in Integrated Principles of Biology I and II (BSC2010 and BSC2011). A grade of "C" or better in Genetics (PCB3063) or an equivalent course.

**Instructor:** Hua Yan  
Office: 511 Carr Hall  
Email: [hua.yan@ufl.edu](mailto:hua.yan@ufl.edu)

**Class Schedule:** Monday, Wednesday, Friday, Period 5 (11:45 AM - 12:35 PM)

**Class Location:** Turlington Hall 2353

**Recommended Textbook:** EPIGENETICS 2<sup>nd</sup> Edition

By C. David Allis, Marie-Laure Caparros, Thomas Jenuwein,  
Danny Reinberg  
2015 by Cold Spring Harbor Laboratory Press (Publisher)

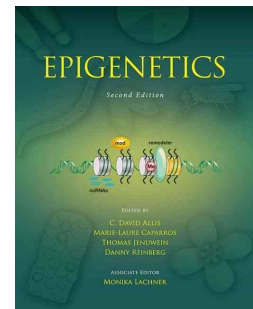
You may find the book in the UF Bookstore:

<https://www.bkstr.com/floridastore/product/epigenetics-603780-1>

or in the Cold Spring Harbor Laboratory Press:

<https://www.cshlpress.com/default.tpl?action=full&cart=1597252342182565782&--eqskudatarq=987&typ=ps&newtitle=Epigenetics%2C%20Second%20Edition>

or other sources.



**Course website:** <https://elearning.ufl.edu/>

(Select Log in to E-Learning) Class material including the syllabus, course slides, assigned papers, and other information related to the course will be posted on the course website on e-Learning.

**Office hours:** Monday after class (12:35 PM–1:25 PM) or by appointment

**Email:** All email correspondence must be from your @ufl.edu account, have your full name in the body of the email, and contain the course number in the subject line. Emails not meeting these requirements may not be answered quickly.

**Course Objectives:** This course is an introduction to the epigenetic processes and epigenetic basis of human disease. The course will take a mechanistic view of the epigenetic modifications, including DNA methylation, histone modifications, non-coding RNAs as well as how they regulate chromatin status and gene transcription. This course provides a strong foundation for Biology students, pre-med, and pre-health students. This course will include lectures and in-class group activities. Topics will include, but are not limited to: chromatin dynamics and remodeling, epigenetic modifications, topologically associating domains, dosage compensation, genomic imprinting, pluripotent stem cells, epigenetic reprogramming, as well as how our knowledge of these processes is leading to our

understanding and treatment of human disease. Grades will be assigned based on performance on multiple types of assessments including: exams, in-class activities (required readings, presentations and summaries), and final writing of a mini-review. Exams will emphasize material covered in lecture and assigned information.

### Exams

There will be 3 Exams during the semester. Exams are not cumulative. Exams will cover the material presented in lecture as well as assigned reading. The tests will contain multiple-choice questions, and written short answer questions.

Exam scores are released within a week after the exams, and are available for review for a week after its release. You may not review previous exams after the semester has ended.

### Attendance and make-ups

Students are expected to attend all classes and are responsible for all material covered during the lecture. Students are recommended to read the assigned chapters before coming to class.

No make-up exams will be given without prior permission or documentation of illness. In case of illness, a note from your physician is required. A personal matter may require a note from the Dean of Students (<http://www.dso.ufl.edu/>, 202 Peabody Hall).

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

### Accommodations

Students who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

### In-class group activities

We will separate students into several groups. For the first required reading, all groups present. For the rest of required readings, only one group present the assigned paper and other groups write one-page summaries.

### Final mini-review

Each student is required to write a final mini-review on your interested topic in epigenetics: 3 pages or more, single spaced, including figure(s) and references. This is NOT a group assignment. See Lecture Schedule for the timeline.

### Grading

Course grades will be determined by the scores of the 3 exams plus in-class activities and mini-review as follows: Each exam will be 20% of the total course grade (3 exams = 60%). In-class activities will count as 26% of the course grade, and final mini-review will count for 14% of the course grade. 60% exam scores + 26% activity scores + 14% mini-review scores = 100% course grade.

Point Range (%)	Letter Grade
≥ 93.0	A
≥ 90.0	A-
≥ 87.0	B+
≥ 83.0	B
≥ 80.0	B-
≥ 77.0	C+
≥ 73.0	C
≥ 70.0	C-
≥ 67.0	D+
≥ 63.0	D
≥ 60.0	D-
< 60.0	E

At the end of the semester, letter grades will be assigned based upon the percentage of the exam grades that you have earned during the semester, plus in-class activities and mini-review, using the cut-offs in the adjacent table. These cut-offs may be lowered at the discretion of the instructor, but they will not be increased.

#### Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

#### Resources Available to Students

##### Health and Wellness

- *U Matter, We Care*: [umatter@ufl.edu](mailto:umatter@ufl.edu); 392-1575
- *Counseling and Wellness Center*: <http://www.counseling.ufl.edu/cwc/Default.aspx>; 392-1575
- *Sexual Assault Recovery Services (SARS)*: Student Health Care Center; 392-1161
- *University Police Department*: <http://www.police.ufl.edu/>; 392-1111 (911 for emergencies)

##### Academic Resources

- *E-learning technical support*: [Learningsupport@ufl.edu](mailto:Learningsupport@ufl.edu); <https://lss.at.ufl.edu/help.shtml>; 352-392-4357 (opt. 2)
- *Career Resource Center*: Reitz Union; <http://www.crc.ufl.edu/>; 392-1601
- *Library Support*: <http://cms.uflib.ufl.edu/ask>
- *Teaching Center*: Broward Hall; 392-2010 or 392-6420
- *Writing Studio*: 302 Tigert Hall; <http://writing.ufl.edu/writing-studio/>; 846-1138
- *Student Complaints On-Campus*: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>
- *On-Line Students Complaints*: <http://distance.ufl.edu/student-complaint-process/>

**Procedure for Conflict Resolution** Any classroom issues, disagreements or grade disputes should be discussed first between the instructor and the student. If the problem cannot be resolved, please contact the Undergraduate Coordinator or the Department Chair. Be prepared to provide documentation of the problem, as well as all graded materials for the semester. Issues that cannot be resolved departmentally will be referred to the University Ombuds Office (<http://www.ombuds.ufl.edu>; 392-1308) or the Dean of Students Office (<http://www.dso.ufl.edu>; 392-1261). For further information refer to [https://www.dso.ufl.edu/documents/UF\\_Complaints\\_policy.pdf](https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf) (for residential classes) or <http://www.distance.ufl.edu/student-complaintprocess> (for online classes).

##### Conduct in Class

Please be courteous and **do not talk during lecture** (except during class discussions or activities), as this can be distracting to the professor and the other students. Also, cell phones should be silenced during lecture.

##### Academic Honesty

UF students are bound by The Honor Pledge which states: "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code."

On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.”

The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

### Lecture Schedule

Lecture topics for this course are listed below. This is a flexible, tentative schedule; the dates and amount of coverage of specific topics may vary somewhat from the list below.

Date		Topic	Chapter
		<b>Course Introduction</b>	
Mon 1/12	1	Introduction to the course	
		<b>Overview and Concepts</b>	
Wed 1/14	2	Introduction to epigenetics 1	3
Fri 1/16	3	Introduction to epigenetics 2	3
Mon 1/19		Holiday — no class	
Wed 1/21	4	Introduction to epigenetics 3	3
		<b>Epigenetic Modifications</b>	
Fri 1/23	5	Position-effect variegation	12
Mon 1/26	6	Student presentation	Assigned paper
Wed 1/28	7	DNA methylation in mammals	15
Fri 1/30	8	lncRNA and eRNA	2 (lncRNAs, enhancer RNAs)
Mon 2/2	9	Student presentation	Assigned paper
Wed 2/4	10	<b>EXAM 1</b>	
Fri 2/6	11	Polycomb-group proteins 1	17
Mon 2/9	12	Polycomb-group proteins 2	17
Wed 2/11	13	Student presentation	Assigned paper
Fri 2/13	14	Trithorax-group proteins and nucleosome remodeling 1	18, 21
Mon 2/16	15	Trithorax-group proteins and nucleosome remodeling 2	18, 21
Wed 2/18	16	Student presentation	Assigned paper
Fri 2/20	17	Long-range chromatin interactions 1 Student presentation	19, Assigned paper
Mon 2/23	18	Long-range chromatin interactions 2	19

Wed 2/25	19	Student presentation	Assigned paper
Fri 2/27	20	<b>EXAM 2</b>	
		<b>Epigenetic Regulations</b>	
Mon 3/2	21	Dosage compensation 1	24
Wed 3/4	22	Dosage compensation 2	25
Fri 3/6	23	Student presentation	Assigned paper
Mon 3/9	24	Genomic imprinting 1	26
Wed 3/11	25	Genomic imprinting 2	26
Fri 3/13	26	Student presentation	Assigned paper
Mon 3/16		Spring break	
Wed 3/18		Spring break	
Fri 3/20		Spring break	
Mon 3/23	27	Stem cells	27
Wed 3/25	28	Epigenetic reprogramming	28
Fri 3/27	29	Student presentation	Assigned paper
Mon 3/30	30	<b>EXAM 3</b>	
		<b>Epigenetics and Human Disease</b>	
Wed 4/1	31	Metabolic signaling to chromatin	30
Fri 4/3	32	Neuronal development and function	32
Mon 4/6	33	Student presentation	Assigned paper
Wed 4/8	34	Epigenetics and human disease	33
Fri 4/10	35	Student presentation	Assigned paper
Mon 4/13	36	Epigenetics in cancer 1	34
Wed 4/15	37	Epigenetics in cancer 2	35
Fri 4/17	38	Student presentation	Assigned paper
Mon 4/20	39	A view in perspective	31, 36
Wed 4/22	40	Student presentation	Assigned paper
Fri 4/24		<b>Deadline for mini-review</b>	