

## **MCB 4934/6937: Human Genomics**

All sections

Fall 2018

3 Credits

### **Instructors**

Dr. Jennifer Drew (MCB 4934 and MCB 6937)

Microbiology & Cell Science Department

Email: Through Canvas (or [jdrew@ufl.edu](mailto:jdrew@ufl.edu) if you cannot access e-Learning yet)

\*I am located off-campus so the best way to contact me is email.

Dr. Ana Conesa (MCB 6937 only)

Microbiology & Cell Science Department

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### **Teaching Assistant**

Ms. Angelica Ahrens

PhD student in Microbiology & Cell Science

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### **Basic Course Structure**

This is a combined undergraduate/graduate course. Dr. Drew will lead the undergraduate sections of the course, and Drs. Drew and Conesa will co-lead the graduate sections of the course. All students, undergraduates and graduate students, will complete all the modules, lectures, quizzes and exams (led by Dr. Drew). Undergraduates will have a final paper/presentation on a topic of their choosing and graduate students will complete analysis of papers from the primary literature (led by Dr. Conesa).

### **Office Hours**

Since this is a web-based course and Dr. Drew is located off-campus, office hours will be online by appointment. The office hours will be conducted via the video conference tool in Canvas. Dr. Drew is also available to answer questions by email or to set up an individual phone or Skype conversation, if you prefer. Please see the welcome module material in Canvas for more information on how to use the conferencing tool.

### **Pre-requisites for Undergraduates**

Two semesters of college biology or equivalent

### **Pre-requisites for Graduate Students**

M.S. or Ph.D. student in a life sciences program

### **Course Description**

Increasingly, researchers and health care providers are mining the genome to uncover the basis of disease susceptibility and treatment. Genome-based strategies are used for the detection, treatment, and prevention of many diseases. This course will discuss the field of genomics, how genome sequence data is obtained and analyzed, and most importantly, what can be learned from

an individual's genome. The course will address cutting-edge research in epigenetics, pharmacogenomics, molecular diagnostics, and the microbiome. The course will also include timely topics such as GMO's, stem cells, genetic testing and genome editing. This course will reinforce fundamental concepts in molecular biology and genetics.

The course will be entirely web-based, and all lectures will be delivered online. The reading assignments, course lecture materials and online activities will be posted each week. There will be a quiz deadline each week over the module's material. All exams will be proctored and taken with ProctorU. Specific information about exam proctoring procedures will be posted closer to exam time.

### **Course Goals**

1. To reinforce a solid foundation in molecular biology in order to fully understand how the genome determines traits, including susceptibility to disease.
2. To understand the role of the genome in the development, detection, prevention and treatment of disease.
3. To interpret basic genomics research approaches and outcomes.
4. To appreciate how advances in biotechnology and genomics are personalizing all aspects of medicine including prevention, diagnostics, and treatment.
5. To frame and to participate in broader discussions of the ethics and complexities of this era of biotechnology and precision medicine.

### **List of Weekly Modules and Topics**

Module	Dates	<b><u>Topic</u></b>
1	Aug 22 – Aug 30	Structure and Function of Genome – What is a genome? What is the broad purpose of a genome?
2	Aug 30 – Sept 5	Diversity and evolution – What is the source of genetic diversity? How similar and how different are we?
3	Sept 6 - 12	Classic Mendelian Genetics – How are traits inherited from generation to generation? What are the laws of inheritance?
4	Sept 13 - 19	Biotechnology – How can study genetics information? What can we do with genetic technology?
5	Sept 20 - 26	Genome Sequencing and Bioinformatics – How do we sequence and study a genome?
6	Sept 27 – Oct 3	Genetic Disease: Mendelian and rare disorders – How are they inherited? What is their cause? How are they studies and tracked?
7	Oct 4 - 10	Genetic Disease: Complex disorders – How are they inherited? What is their cause? How are they studies and tracked?
8	Oct 11 -	Genetic Disease: Cancer - What is the role of the genome in cancer

	17	development, progression, detection and treatment?
9	Oct 18 - 24	Genetic Disease: Epigenomics – How is gene expression controlled and what is the effect on human health and disease?
10	Oct 25 – Oct 31	Genetic Disease: Behavior Disorders and Neurogenetics
11	Nov 1 - 7	Molecular Diagnostics and Detection – How can genomic information and biotechnology be used to detect and diagnose disease?
12	Nov 8 - 14	Genome modification – How can the genome be modified for treatment of human disease?
13	Nov 15 – 28**	Pharmacogenomics – How can the genome affect response to drugs?
14	Nov 29 – Dec 5	Public Health Genomics, Microbiome – What is the role of the microbiome in health and disease?

\*\* Extended week because of Thanksgiving

### **E-learning system - Canvas**

The course will be managed entirely through the e-Learning in Canvas (the BLUE button at <https://lss.at.ufl.edu/>). If you are not familiar with this system, you need to become acquainted with it for this course. The LSS homepage contains tips and tutorials for students as well as [computer requirements](#). It is your responsibility to become familiar with e-Learning in Canvas and to ensure that you have the appropriate browsers, settings, internet speed, etc. For any technical questions regarding Canvas, please visit the LSS site (<https://wiki.helpdesk.ufl.edu/FAQs/E-Learning>) and/or the UF Help desk (<http://helpdesk.ufl.edu/>). They can address technical issues such as not being able to view course materials, not being able to access the quizzes, not being able to send mail, etc. **All technical issues/questions/comments should go to the Help Desk first (352-392-HELP).** They are the experts. The Help Desk suggests that if you encounter any problem (error messages, etc.) that you take a screen shot of the problem and save it. This will help the Help Desk in fixing your problem.

### **Email and Announcements**

All email communication regarding this course will be done through the Conversations tool (Inbox) of Canvas. This mail system is private and secure. It is your responsibility to check your Canvas mail and Announcements **frequently** to stay updated on the course. Please check the course site a minimum of two times per week to be certain that you are not missing any important communications. As the instructors, we will respond to your questions and emails as promptly as we can. By maintaining all email communication through Canvas instead of other email domains, it reduces the chance that discussions will get lost among our outside accounts.

### **Textbook**

The textbook is *recommended*, but not required. Genetics From Genes to Genomes by Hartwell, Goldberg, Fischer, Hood. 6th Edition. Published by McGraw Hill, 2018.

The book is available in digital form or in hardback, to rent or buy.

Other resources will be posted.

## **Course modular structure**

The course is structured as 14 Modules – approximately one each per week of the semester. Each module focuses on a different topic. The topics build on each other so in order to understand a topic in Module 6, for example, it is necessary that you understand the material from Module 1. An entire module's worth of material is posted at once.

New modules are posted each week on THURSDAY. For each module, there will be several items to complete. Click on the link for each item. The first item will always list the **learning objectives** for the week. Keep the learning objectives in mind as you learn the material. After reading the learning objectives, please go through the material in the order presented. The next item in the list will usually be the reading assignment, followed by the lectures, and links to any online tutorials or modules. After you go through the material in the order presented, you are always free to return and visit any of the content. The welcome video will give an example of the types of course content and how it will be presented. The pdf of the lecture slides of each module will also be posted for your convenience. This convenience is for students who wish to print out the slides and follow along with the lecture, study the notes later, etc. The lectures slides will only be available in pdf format.

Each module includes a quiz. The quizzes are due every WEDNESDAY by 11:59 PM. The material will be available to you throughout the semester, but once a quiz due date passes, this means that you can no longer access the quiz. This means that both of your quiz attempts must be completed by midnight on Wednesday nights. If you only attempt a quiz once before due date on Wednesday, that quiz grade is the only one that will count. (See below for more info on quizzes).

## **Assessments**

### **Exams**

Three proctored, non-cumulative exams will be administered throughout the semester. Each exam is worth 18% of your grade. All exams will be proctored and taken with ProctorU. Specific details regarding the exams will be given closer to the exam dates. If an exam is taken without approved proctoring arrangements and without adhering to proctoring criteria (eyes only on the screen, closed book/notes, no talking or other devices, etc) credit will not be given and the score will be a zero. If it is detected that a student's e-Learning account was signed into by more than one instance during an exam (i.e., two individuals signed into the same student account during an assessment), credit will not be given and the score will be zero.

There are no make-ups for exams without prior notification and proper documentation for an excused event or activity.

Exam dates will be announced in the first few weeks of class.

### **Quizzes**

Brief quizzes will be given that cover each module. These short quizzes need to be completed by **Wednesday evening by 11:59 PM** of each week. Following the lectures and taking the quizzes ensures timely participation and progress in the course. These quizzes are a learning tool so you

may take each quiz up to **two times each** and only your highest score of each week's quiz will be recorded for a grade. Your quiz average will count for **15%** of your final grade. There will be a total of 15 quizzes (one for each module plus a syllabus quiz at the beginning of the semester). Only the 12 highest quiz scores will be incorporated into your final grade. This leaves 3 quizzes that can be missed or dropped for any reason including minor illness, travel, meetings, and **technical problems** etc. Rarely, technical issues may occur while you are taking the timed quiz, and any quizzes affected by technical problems will count against your drops. A quiz will not be re-opened or reset if it is interrupted by technical difficulties. (NOTE: A slow Internet connection may affect timed quizzes, but it is your responsibility to use a connection at the speed suggested in the LSS homepage.)

Only quizzes that have been submitted by students can be accessed for studying for exams. Therefore, even if you choose to use a week as a drop and do not study, try to take the quiz anyway by the deadline so you can still access the quiz questions at later date. If you do not take a quiz during the open quiz window, then Canvas shuts you out of the quiz, and it cannot be reopened for you.

Following the close of each quiz window and for exams 1 and 2, you have 10 calendar days to contest your quiz/exam grade in an email (i.e., a student cannot request a grade correction on quiz 2 during the last week of the course). Any requests for points must include a clear justification of your response. For example, please do not send an email saying "tell me why I am wrong", but rather send an email saying, "this is why I think my response is a better answer or is as complete or appropriate...."

Please note that questions and comments about any quiz/exam question are welcome at any time during the semester for the purposes of understanding and education.

#### **Undergraduate Sections Only (MCB 4934):**

***Discussion Boards, Participation and Assignments*** - Participation in discussion boards and other smaller assignments will count towards 13% of your final grade. More details will be provided in class. The discussion boards and activities will highlight current genomic discoveries.

***Final presentation*** - A final paper/presentation will be worth 18% of your final grade. More details will be provided in class. Students will have the option to write a paper or prepare a brief video presentation on a recent genomic discovery or development. This assignment will allow students to explore a specific disease, treatment, or technology of interest more deeply.

#### **Graduate Section Only (MCB 6937):**

***Analysis of Papers from the Primary Literature*** - Students enrolled in the 6937 level of the course will read, analyze and discuss papers from the primary literature. Dr. Conesa will lead this activity and it is worth 31% of your final grade.

### **Course Grade Breakdown:**

	<b>Undergraduate</b>	<b>Graduate</b>
Exams (3 total each worth 18%)	54%	54%
Final presentation	18%	n/a
quizzes	15%	15%
Discussion/assignments	13 %	n/a
Research paper analysis	n/a	31%
Total	100%	100%

### **Grading Scale:**

	<b><u>Percentage</u></b>
A	90 or above
A-	87-89
B+	84-86
B	80-83
B-	77-79
C+	74-76
C	70-73
C-	67-69
D+	64-66
D	60-63
D-	57-59
E	56 or below

### **Attendance policy**

Please see UF policy at: <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/#absencestext>

Since the course is online and the material can be accessed at your convenience, missed weekly quizzes cannot be made up and will count as one of your three dropped quiz grades. Exams are to be proctored and taken the day they are scheduled.

### **Academic Honesty**

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.” You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit 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.”

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dsoufl.edu/SCCR/honorcodes/honorcode.php>.

**Additional comments regarding academic integrity:**

Students are encouraged to discuss material with each other from the course, help each other understand concepts, study together, and even discuss assessment questions with each other once the quiz window is closed. However, the following is considered academic dishonesty, and I expect that no student will ever do any of the following:

- Have another person complete a quiz in this course
- Copy another student's quiz in this course
- Collaborate with anyone while taking a quiz in this course
- Discuss the questions and answers of a quiz with other students while the quiz window is still open
- Manipulate and/or distribute any materials provided in this course for any purpose (including course lecture slides).

**Software Use**

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.

**Campus Helping Resources**

Students experiencing crisis or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, [www.counseling.ufl.edu/cwc/](http://www.counseling.ufl.edu/cwc/)*

- Counseling Services
  - Groups and Workshops
  - Outreach and Consultation
  - Self-Help Library
  - Training Programs
  - Community Provider Database
- *Career Resource Center*, First Floor JWRU, 392-1601, [www.crc.ufl.edu/](http://www.crc.ufl.edu/)

### **Students with Disabilities**

Students requesting class accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. 0001 Reid Hall, 352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)

### **Statement on Distance Education Courses**

Should you have any complaints with your experience in this course, please visit <http://www.distance.ufl.edu/student-complaints>.