GENETICS – PCB 3063

Fall 2016
MMC Campus – SIPA 125
M/W/F, 9:00 am – 9:50 am

Professor: Dr. Jose M. Eirin-Lopez
Marine Sciences Building, Office 360 (BBC)
lab website: chromevol.com
lab facebook: /chromevol
lab twitter: @chromevol

COURSE DESCRIPTION AND PURPOSE

The goal of this course is to introduce students to **Genetics**, providing an understanding of concepts that are essential to modern biologists. A working knowledge of genetics is important in disciplines ranging from **ecology to medicine**. This course will place special emphasis on **heredity and variation**, the **mechanisms governing genetic inheritance**, **mendelian genetic analysis**, the **nature and organization** of the hereditary material, the sources and types of **genetic variation**, as well as **dynamics of genes in populations**.

The course is divided into three parts:

- **Part I** will introduce the students to the mechanisms governing the inheritance of genetic traits.
- **Part II** will explore the nature, replication and organization of the genetic material in chromosomes, as well as the different types of genetic mutations.
- **Part III** will cover chromosomal variation, epigenetics, complex traits and the dynamics of genes in populations.

LEARNING OBJECTIVES

Upon successful completion of this course, you will be able to:

- Explain Mendel's principles of inheritance and apply these to problems of inheritance
- Describe the different forms of inheritance patterns and identify these in genetic data
- Use and interpret probabilities and statistics in the gathering, predicting, and analysis of genetic data
- Describe various types of genetic crosses and indicate when/why they would be used by a geneticist
- Explain more complex modes of inheritance and how sex influences the inheritance and expression of genes (e.g. sex-influenced traits, cytoplasmic inheritance, genomic imprinting)
- Use this information in predicting genetic outcomes and the analysis of genetic data
- Compare the effect of linkage and independent assortment on genetic outcomes and assess data to determine if genes are linked or on separate chromosomes

- Explain how crossing over produces recombination and use recombination frequencies to construct a genetic map
- Use genetic maps to predict gametic and mating outcomes
- Describe early studies that led to DNA as the genetic material and/or interpret results from these studies
- Describe the molecular structure of DNA and RNA and indicate similarities and differences
- Describe the historic experiment that demonstrated DNA replication follows a semi-conservative model
- Explain how proofreading and repair is accomplished during DNA synthesis
- Define and identify the various types of mutations that occur at the DNA and protein levels and explain and recognize the relationship between mutations and new alleles.
- Describe and recognize a variety of abnormalities in chromosome structure and number and explain how these anomalies arise and are detected
- Explain the molecular structure of chromosomes as it relates to storage, gene expression, and sequence function
- Describe the mechanisms underlying the epigenetic regulation of the genetic material
- Explain the quantitative basis of complex phenotypes
- Describe how gene frequencies change in populations

HOW THIS COURSE WILL HELP YOU SUCCEED

The study and understanding of genetics is fundamental to complete your education and to grow as a human being. After all, the single thing all living organisms share is that we are the product of a set of genetic instructions encoded by nucleic acids. In addition, this course will help you acquire a conceptual and practical framework that you can apply to solve complex problems in in your future research, professional practice, or clinical practice.

Beyond its formal learning objectives, I hope that this course will inspire you to:

- Realize your potential to learn and master complex concepts
- Be open minded about science and genetics
- Appreciate the role of genetics shaping life on earth
- Care about nature and the environment and their benefits for society
- Be understanding about others' interests, limitations and background
- Become curious and creative in using evolutionary thinking to solve biological, medical and legal problems

IMPORTANT INFORMATION

Policies

Please review the FIU's Policies webpage. The policies webpage contains essential information regarding guidelines relevant to all courses at FIU, as well as additional information about acceptable netiquette for online/hyrbid courses.

Professional and Academic Integrity

Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and to honestly demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions.

Academic Misconduct policies and procedures will be strictly enforced regarding cheating. Anyone caught cheating will be asked to leave the class, will be given an "F" for the whole course and a petition will be sent to Academic Affairs. **NO EXCEPTIONS**.

Incomplete Grades

An incomplete grade will be delivered under very exceptional documented circumstances such as major sudden and unexpected serious health problem of the student or his/her family. Other excuses will not be accepted to provide an incomplete grade.

Letters of Recommendation

Letters of recommendation will only be written for the top 3 students in the class based on the final numeric grade.

Accessibility And Accommodation

The Disability Resource Center collaborates with students, faculty, staff, and community members to create diverse learning environments that are usable, equitable, inclusive and sustainable. The DRC provides FIU students with disabilities the necessary support to successfully complete their education and participate in activities available to all students. If you have a diagnosed disability and plan to utilize academic accommodations, please contact the Center at 305-348-3532 or visit them at the Graham Center GC 190.

Please visit our ADA Compliance webpage for information about accessibility involving the tools used in this course.

Please visit Blackboard's Commitment Accessibility webpage for more information.

For additional assistance please contact FIU's Disability Resource Center.

Expectations Of This Course

As a student in this course, you are expected to:

- **Review the Syllabus**
- **Review the Syllabus**
- **Review the Syllabus**
- Review and follow the course **calendar**
- Submit assignments by their respective **due dates**
- Log in to the course **blackboard** and **Launchpad at least 2 times per week**
- Respond to emails within 2 days

I, the professor, will:

- Log in to the course at least 3 times per week
- Respond to emails within 2 days
- Respond to General Discussion posts within 2 days (see Course Communication section)
- Provide feedback on assignments within 7 days of submission

Textbook

- **Required Main Text**: Genetics: A Conceptual Approach, 5th Edition, by Benjamin A. Pierce, Freeman.
- **Required online tool: Launchpad** for Pierce's Genetics (ISBN-10: 1-4641-5090-7; ISBN-13: 978-1-4641-5090-6; Format: LaunchPad).
- **Lecture notes and online material**: Will be available at the FIU-Blackboard educational tool (http://fiu.blackboard.com) organized in the folders corresponding to the different sessions.

COURSE DETAIL

Course Communication

Outside of our in-person meetings, we'll stay in touch through **Blackboard**.

Email. Use email for personal, or time-sensitive questions. The Email feature is an external communication tool that allows users to send emails to users enrolled within the course (including the professor). The Email tool is located on the Course Menu, on the left side of the course.

General Discussion Forum. Post your question or comment here if it is related to class material and your classmates could also benefit from my response. Keep in mind that your discussion forum postings will likely be seen by other members of the course. Please review our netiquette policies.

Assessments

Assessments in this course are not compatible with mobile devices and should not be taken through a mobile phone or a tablet. If you need further assistance please contact FIU Online Support Services.

Syllabus Quiz (1)

- Available at **Blackboard**
- **5% of your final grade**
- Due at the **end of the SECOND week** of class (09/04, 11:59 PM, ET)
- Will test you on your knowledge of the syllabus
- **10 multiple-choice questions** and **10 minutes** to complete

Learning Curve Activities (15)

- Available at **Pierce's Genetics Launchpad (see registration info below)**.
- **35% of final grade**
- Each will be **available online until the deadline** date set in the calendar at

11:59 PM, ET (you can complete them anytime until deadline)

- Each covers content from corresponding lectures as indicated in the calendar
- Each contains different types of questions
- Students have to **reach a target score of 450 to receive full credit** (see instructions in Launchpad). Students who do not reach the target score before due date will not receive a grade for the activity.

Exams (3)

- Available at **Blackboard** (exams will be **online**)
- **20% each, for a total of 60% of final grade**
- Each exam contains **60 multiple-choice test questions**
- Questions will be **directly related to lectures** and selected from Pierce's Genetics Launchpad sections: **Chapter Reading Quiz**, **Learning Curve Activity** and **End-of-Chapter Problems**
- Each exam will be available online on the dates indicated below from 9 AM – 11:59 PM, ET
- Once you start the exam you will have **60 minutes** to complete the test
- Exam 01 (Monday, **Sep. 19**) -covers lectures corresponding to **book chapters 1,3,4,5**
- Exam 02 (Wednesday, **Oct. 19**) -covers lectures corresponding to **book chapters 7,10,11,12,18**
- Exam 03 (Monday, **Nov. 28**) -covers lectures corresponding to **book chapters 8,21,24,25**
- **Exam make-ups**: You can only do **make-up for ONE** of the three exams (e.g., the one with the lowest grade or the one you could not take on its original date). Make-ups will take place on 12/05. **Each** will consist of **60 questions** to be completed in **60 minutes**. **BE AWARE**: If you take the make-up, you will get the grade of the make-up, whether that is **higher** or **lower** than your grade in the original exam. Thus, take the make-up ONLY if you have prepared it adequately (or if you are making up for an exam you did not take).

How to Succeed in this Course

Utilize Your Resources. Make sure that you purchase the required textbook. I follow that book to prepare my class lectures, which are the guiding thread of the present course. In addition, I will provide you with online materials and other resources such as quizzes so you can work on your own. All these materials will be available for you in **blackboard** and in **Pierce's Genetics Launchpad**.

Participate. This course will not be any good to you or your future if you don't take an active part on it. First, I want you to be excited and happy about the course, so you can loosen up and start participating. I know sometimes is tough to speak up in front of everybody but guess what, everybody is as frighten as you are, so relax. They key for that is to know what you're talking about, so prepare the class in advance of the in person session: read the book chapters assigned to that session, revise the lecture presentation, practice reading quizzes, end-of-chapter problems and complete the learning curve activities.

Communicate. We will see each other in person quite often, so we will have the chance of discussing and clarifying all your questions. Don't let that opportunity go to waste, come to me and ask all questions you have. You should let me know what ideas and tools are challenging to you and how you are doing in the class. If you start this habit early in the semester, then I will be able to better tailor our activities to help you learn.

Have Fun. I don't want to get external distractions, prejudices or invisible barriers in our way to knowledge, so we'll get rid of those right away from the very beginning. In my experience, being relaxed, friendly, funny and close to each other is a great way to do so. I guarantee you that if you do that, you will be having tons of fun and you will be making the most of this learning process. Follow this Buddhist proverb: happy face, happy life.

Grading

Course Requirements	**Number of Items**	**Points for Each**	**Total Points Available**	**Weight**
Syllabus Quiz	1	10	10	5%
Learning Curve Activities	13	10	130	35%
Exams	3	60	180	60%
Total	**19**		**320**	**100%**

Letter	**Range (%)**	**Letter**	**Range (%)**
A	90-100	C	70-75
B+	86-89	D	60-69
B	80-85	F	<60
C+	76-79		

COURSE CALENDAR

Date	**Type**	**Week**	**Lecture**	**Book Chapter**
08/22	In person	I	Course Introduction & Syllabus Q&A	
08/24	**Online**	**I**	**Quiz Syllabus (blackboard)**	
08/26	In person	I	Introduction	**1**
08/29	In person	II	Basic Principles of Heredity	**3**
08/31	**Online**	**II**	**Learning Curve Activities book chapters 1 & 3**	
09/02	In person	III	Sex Determination and Sex-Linked Characteristics (I)	**4**
09/07	In person	III	Sex Determination and Sex-Linked Characteristics (II)	**4**
09/09	**Online**	**III**	**Learning Curve Activity book chapter 4**	
09/12	In person	IV	Extensions and Modifications of Basic Principles (I)	**5**

09/14	In person	IV	Extensions and Modifications of Basic Principles (II)	**5**
09/16	**Online**	**IV**	**Learning Curve Activity book chapter 5**	
09/19	**Online**	**V**	**EXAM 01 (Ch. 1,3,4,5) available online from 9 AM – 11:59 PM, ET 60 minutes to complete once started**	
09/21	In person	V	Linkage and Recombination (I)	**7**
09/23	In person	V	Linkage and Recombination (II)	**7**
09/26	**Online**	**VI**	**Learning Curve Activity book chapter 7**	
09/28	In person	VI	The Chemical Nature of the Gene (I)	**10**
10/30	In person	VI	The Chemical Nature of the Gene (II)	**10**
10/03	**Online**	**VII**	**Learning Curve Activity book chapter 10**	
10/05	In person	VII	DNA Organization and Chromosome Structure (I)	**11**
10/07	In person	VII	DNA Organization and Chromosome Structure (II)	**11**
10/10	**Online**	**VIII**	**Learning Curve Activity book chapter 11**	
10/12	In person	VIII	Gene Mutations and DNA Repair	**18**
10/14	In person	VIII	DNA Replication and Recombination	**12**
10/17	**Online**	**IX**	**Learning Curve Activities book chapters 18-12**	
10/19	**Online**	**IX**	**EXAM 02 (Ch. 7,10,11,12,18) available online from 9 AM – 11:59 PM, ET 60 minutes to complete once started**	
10/21	In person	IX	Chromosome Variation (I)	**8**
10/24	In person	X	Chromosome Variation (II)	**8**
10/26	**Online**	**X**	**Learning Curve Activity book chapter 8**	
10/28	In person	X	Epigenetics (I)	**21**
10/31	In person	XI	Epigenetics (II)	**21**
11/02	**Online**	**XI**	**Learning Curve Activity book chapter 21**	
11/04	In person	XI	Quantitative Genetics (I)	**24**
11/07	In person	XII	Quantitative Genetics (II)	**24**
11/09	**Online**	**XII**	**Learning Curve Activity book chapter 24**	
11/14	In person	XIII	Population Genetics (I)	**25**
11/16	In person	XIII	Population Genetics (II)	**25**
11/18	**Online**	**XIII**	**Learning Curve Activity book chapter 25**	
11/28	**Online**	**XIV**	**EXAM 03 (Ch. 8,21,24,25)**	

			available online from 9 AM – 11:59 PM, ET 60 minutes to complete once started	
12/05	**Online**	**XIV**	**MAKE-UP EXAMS**	

Information for Registration with the ONLINE portion of the course

Dear Students,

The online portion of our course is open for student registration.

To register for the course go to:
http://www.macmillanhighered.com/launchpad/pierce5e/3698848

PLEASE bookmark the page to make it easy to return to.
You have three options to enroll in the course: you can purchase direct access, you can buy an access code, or you can get free 21 day access while deciding. Your registration options are explained here.

To navigate and start using LaunchPad please consult the Get Started guide and/or view this video.

If you have problems registering, purchasing, or logging in, please contact Customer Support. You can reach a representative 24 hours a day, 7 days a week:

- through the online form
- by chat

Or by phone at (800) 936-6899:

- Monday through Thursday 7:00 a.m. to 3:00 a.m.
- Friday 7:00 a.m. to 11:00 p.m.
- Saturday 11:30 a.m. to 8:00 p.m.
- Sunday 11:30 a.m. to 11:00 p.m.

Looking forward to seeing you in class!
Jose Eirin-Lopez
jeirinlo@fiu.edu