

# BIOL 2416: GENETICS

CRN 69080

Spring 2011, Regular Term

CREDIT: 4 semester hours

Friday 8-11 AM in SBC 529 (lab)

Friday 12-3 PM in SBC 511 (lecture)

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Spring Branch Campus 804

ofc (713) 718-5875

**COURSE DESCRIPTION:** Study of the principles of molecular and classical genetics and the function and transmission of hereditary material (DNA). Will include genetic engineering (manipulation of DNA in the lab to produce a useful product). May include population genetics (study of genetic variation within populations) and quantitative genetics.

**PREREQUISITE: BIOL 1406 (General Biology I)**

## REQUIRED TEXT:

Russell, Peter J. 2010, *iGenetics: A Molecular Approach*, San Francisco: Benjamin Cummings Publishers, 3<sup>rd</sup> Ed.

Please bring your book to each class. Other internet resources TBA.

**EMAIL:** You will need an email account. Outside class, I will communicate primarily by email. You are responsible for checking your email frequently. Free internet access is available at TCSC 110 and Westgate 228. Enrollment at HCC automatically triggers a free email account: [first.last@student.hccs.edu](mailto:first.last@student.hccs.edu). If you have a preferred email, please notify the instructor. **Please use my HCCS email account rather than Blackboard email!**

**LECTURE NOTES:** PowerPoint lecture slides will be posted on BlackBoard sometime before class. Other materials are available on the Learning Web: <http://learning.hccs.edu/faculty/tineke.berends>. The lecture notes are in no way complete; they serve as an outline only. You MAY NOT share these files with anyone outside of class without express permission of the instructor, nor may you post any part online.

**ATTENDANCE is MANDATORY.** Roll will be taken. Always assume we will have class unless officially notified by the college that class has been cancelled. To encourage timely attendance, in-class “warm up” exercises will be **randomly** administered. Students earn full points on warm up exercises as long as they participate. Warm up exercises will total 5% of the course grade. If you must miss a class, you are responsible for everything covered in your absence. **DO NOT MISS CLASS.**

**WITHDRAWAL POLICY: Students wishing to withdraw from the class MUST DO SO BY 4:30PM SHARP, APRIL 14, 2011.** If you wish me to administer the withdrawal for you, I will need to know by **12PM SHARP, April 13, 2011.** Due to visa and/or financial aid concerns, **I DO NOT WITHDRAW STUDENTS, EVEN IF STUDENTS HAVE STOPPED COMING TO CLASS. DO NOT ASSUME THAT EVEN THOUGH YOU HAVE STOPPED COMING TO CLASS, YOU WILL BE AUTOMATICALLY WITHDRAWN.** Unless withdrawn, grades are calculated as stipulated in this syllabus. Missed exams, assignments etc. will result in a grade of

**ZERO.** Beware that, as mandated by the Texas State Legislature, students who repeat a course for a third or more times may soon face significant tuition and fee increases at HCC and other Texas public colleges and universities. Please ask your Professor or Counselor about opportunities for tutoring or other possible assistance prior to considering course withdrawal or if you are not receiving passing grades.

**LAB NOTEBOOK:** You must maintain your own bound lab notebook in accordance with industry rules. I will explain what that entails in class. The notebook **MUST** be brought to every lab session. The notebook will be graded at the end of the semester, and will total 5% of the course grade.

**LAB REPORTS:** You will have to write a formal lab report for most lab exercises based on the raw data recorded in your lab notebook. Lab reports are due as shown on the tentative schedule). Beware lab exercises may take more than one lab session to complete. We will go over the lab report format in class. Although you may discuss data with your lab partner, each lab report must be an individual effort (NO copying) and must be turned in separately when due (NOT in the lab notebook). The lab reports plus other assignments will total 10% of the course grade.

**LAB SAFETY:** All lab safety rules must be followed (we will go over them). Absolutely no kids, smoking, eating, or **drinking (including water!)** in the classroom or lab. Cell phones/pagers/lap tops must be turned off unless prior permission from the instructor is obtained.

**RESEARCH PAPER:** An original paper (a minimum of 1500 words, turned in as a hardcopy) will be due **week 14**. Topic areas may include 1) a biography of a famous geneticist detailing his/her contribution to the field of genetics, 2) a commercial biotechnology product involving genetics, 3) a genetic disease. Or 4) genetics in the news (in 2010-2011). To avoid duplicate topics, or topics that are too broad to cover in 1500 words, you must submit two potential paper topics for review by **week 6**. A one-page outline is due **week 10** and will be graded as an assignment (part of your lab report grade). For full credit, papers **must** include a minimum of five references from at least three different types of resources (book, popular magazine, scientific publication, newspaper, personal communication with an established scientist, or (reliable!) web source). The paper will total 20% of the course grade.

**EXAMS:** The use of cell phones in any way is prohibited. All materials other than a **SMALL GREEN SCANTRON**, pencil, eraser, the exam, and – if permitted – a calculator, must be out of sight. Scratch paper is allowed after examination by the instructor. Students coming late will **NOT** be given extra time to complete the exam. **NO** bathroom breaks during the exam – use the bathroom **BEFORE** you start. Students may earn additional points per exam for “Evidence of Meaningful Studying” (flashcards, vocabulary lists, concept maps etc.) **THESE ITEMS ARE DUE 8AM SHARP ON EXAM DAY. NO EXCEPTIONS.** Exams will total 60% of the course grade.

**MAKEUP EXAMS** are up to the discretion of the instructor. **There will be NO makeup exams for missed exams involving AN UNEXCUSED ABSENCE (NO-SHOWS WITHOUT PRIOR NOTIFICATION OR WITHOUT PROPERLY DOCUMENTED EMERGENCY).** Makeup exams will likely take place in SBC's testing center in room 118. I will notify you by email as soon as your makeup exam has been dropped off at the center. You must call the center at 713-718-5670 to make an appointment **BEFORE THE EXPIRATION DATE.** You will need to present a valid picture ID.

**STUDENT CONDUCT:** Appropriate student conduct is expected at all times (see student handbook). Students caught cheating will receive a grade of ZERO for the exam. Repeat cheaters will receive a letter grade of F for the course. Papers may be checked electronically for plagiarism. Plagiarized papers will be awarded a grade of ZERO.

**ADA:** Students who require reasonable accommodations for disabilities must contact the ADA Counseling office at (713) 718-5422 at least two weeks before the first scheduled exam. Faculty members are not authorized to make necessary arrangements without prior official recommendations from the ADA office.

**GRADE CALCULATION:**

Best 3 of 4 Lecture Exams: 60%  
 Lab Notebook: 5%  
 In-class warm-up exercises 5%  
 Lab reports & homework: 10%  
 Paper: 20%

**GRADING SCALE:**

A=90% and up  
 B=80-89%  
 C=70-79%  
 D=60-69%  
 F=59% and below

**NO EXCEPTIONS**

Total: 100%

**\*Grading rubrics will be posted on the Learning Web**

**IMPORTANT DATES:**

1/19: Last Day to Drop/Add/Swap  
 1/31: Official Date of record  
 2/21: President's Day  
 2/15: Last day to file for fall completion of degrees/certificates  
 3/14-3/20: SPRING BREAK  
**4/14: LAST DAY FOR ADMINISTRATIVE/STUDENT WITHDRAWAL (4:30PM)**  
 4/22-4/24: EASTER HOLIDAY  
**5/13: Final EXAM (8AM sharp)**  
 5/20: Grades available to students at <http://www.getgrades.com>

**TENTATIVE COURSE SCHEDULE:**

DATE:	LECTURE READING ASSIGNMENT	LAB ACTIVITIES:
week 1 <b>1/21</b>	Syllabus. CH1: Genetics: An Introduction.	DNA origami.

	CH2: The Genetic Material.	
week 2 <b>1/28</b>	CH3: DNA Replication. CH4: Gene Function.	Lab Safety. How to Keep a Lab Notebook. How to write a lab report. DNA spooling experiment.
week 3 <b>2/4</b>	CH5: Transcription. CH6: Translation.	<b>DNA spooling lab report due @ 8AM.</b>
week 4 <b>2/11</b>	<b>EXAM 1 @ 12PM.</b> CH7: DNA mutation, repair, and transposable elements.	Online micropipetting. Micropipetting and microcentrifuge practice lab.
week 5 <b>2/18</b>	CH8: Mapping and Sequencing of Genomes. CH9: Functional and Comparative genomics.	<b>Access Excellence ACTIVITY and WORKSHEET and Micropipetting Practice Sheet due @ 8AM</b>
week 6 <b>2/25</b>	<b>2 PAPER TOPIC SUGGESTIONS DUE @ 8AM.</b> CH10: Recombinant DNA Technology.	Pour gels. Restriction digests.
week 7 <b>3/4</b>	CH12: Mitosis and Meiosis. CH11: Mendelian Genetics. CH12: Cont'd. (Chromosomal Basis of Inheritance)	Run and stain gels.
week 8 <b>3/11</b>	<b>EXAM 2 @ 12PM.</b> CH13: Extensions of Mendelian Genetics.	<b>DNA restriction mapping lab report due @ 8AM.</b>
week 9 <b>3/25</b>	CH14: Gene Mapping in Eukaryotes	Hereditary Hemochromatosis Online Exercise.
week 10 <b>4/1</b>	<b>One-page paper outline due @ 8AM.</b> CH15: Genetics (gene mapping) of bacteria and bacteriophages. CH16: Variations in Chromosome Structure and Number.	Plasmid DNA quantitation by fluorometry.
week 11 <b>4/8</b>	CH 17: Regulation of Gene Expression in Bacteria and Bacteriophages.	<b>HFE GeneGatewayWorkbook Worksheet due @ 8AM.</b> Sequencing Reactions and Li-Cor gel.
week 12 <b>4/15</b>	<b>EXAM 3 @ 12PM.</b> CH18: Regulation of gene expression in Eukaryotes.	Second Li-Cor Gel. Sequencing data analysis.
week 13 <b>4/29</b>	CH19: Genetic Analysis of development. CH20: Genetics of Cancer.	Sequencing data analysis.
week 14 <b>5/8</b>	<b>PAPER DUE @ 8AM.</b> CH21: Population Genetics. CH22: Quantitative Genetics.	<b>NOTEBOOK and DNA sequencing lab report due @ 8AM.</b>
week 15 <b>5/13</b>	<b>Non-comprehensive FINAL EXAM @ 8AM sharp.</b>	