



CENTRAL CAMPUS

BIOLOGY 2416 /GENETICS/

Summer – 2nd Five Weeks 2019, COURSE NUMBER 13970

4 credits, ~50 hrs Lecture/~28 hrs Lab

Instructor: Dr. Brian C. Mahon

brian.mahon@hccs.edu

713-718-6423

Office Hours: Monday/Wednesday/Friday: TBA 11:00 am – 12:00 pm

TEXTBOOK: Pierce, Genetics: A Conceptual Approach 6th Edition

Learning Web: Syllabus and other relevant course information may be posted on the Learning web found at the following link: <http://learning.hccs.edu/faculty/brian.mahon>

CANVAS: Assignments may be posted online on Eagle online CANVAS found at the following link: <https://eagleonline.hccs.edu>. Your Username is same as your student ID number used for registration (For example: W0034567). Your default password is “distance”. Once you log-in, you can change the password.

LECTURES: Monday/Wednesday/Friday: WHI Room 203 12:00 pm – 3:40 pm

LABS: Tuesday/Thursday: WHI Room 316 12:00 pm – 3:40 pm

COURSE OVERVIEW

Program Student Learning Outcomes (PSLOs) for the Biology Discipline

1. Will display an understanding of biological systems and evolutionary processes spanning all ranges of biological complexity, including atoms, molecules, genes, cells, and organisms.
2. Will integrate factual and conceptual information into an understanding of scientific data by written, oral and/or visual communication. (This may include successful completion of a course-specific research project or a case study module).
3. Will demonstrate proficiency and safe practices in the use of laboratory equipment and basic laboratory techniques.
4. Will apply principles of the scientific method to problems in biology in the collection, recording, quantitative measurement, analysis and reporting of scientific data.

COURSE DESCRIPTION: Study of the principles of molecular and classical genetics and the function and transmission of hereditary material (DNA). Also will include *population/evolutionary genetics* and *quantitative genetics*. Core curriculum course.

STUDENT LEARNING OUTCOMES:

SLO1: Deduce information about genes, alleles, and gene functions from analysis of genetic crosses and patterns of inheritance.

SLO2: Describe the molecular anatomy of genes and genomes.

SLO3: Describe the mechanisms by which an organism's genome is passed on to the next generation.

SLO4: Describe the phenomenon of linkage and how it affects assortment of alleles during meiosis.

SLO5: Describe the processes that can affect the frequency of phenotypes in a population over time.

SLO6: Compare different types of mutations and describe how each can affect genes and the corresponding mRNAs and proteins.

SLO7: Apply the results of molecular genetic studies in model organisms to understanding aspects of human genetics and genetic diseases.

SLO8: Interpret results from molecular analyses to determine the inheritance patterns and identities of human genes that can mutate to cause disease.

SLO9: Describe the molecular basis of replication, transcription and translation in Eukaryotes and Prokaryotes.

PREREQUISITE: Students must have completed one of the following with a grade of C or higher: BIOL 1306 (or 1406), 1311 (or 1411), 1313 (or 1413), 2301 (or 2401), 2302 (or 2402), 2320 (or 2420), or 2321 (or 2421)

GENERAL GUIDELINES

1. **ATTENDANCE:** Roll will be taken, and I expect students to attend all classes. Good class attendance is absolutely essential to do well in this course! **I reserve the right to drop a student after missing in excess of 12.5% of the hours of instruction.** It is a good idea to exchange names and phone numbers with others in the class so that you can obtain the information you missed as quickly as possible. In case of a prolonged absence (1 or more class meetings), the instructor should be notified. In the event you are absent, it is your responsibility to check for information you missed as a result of your absence.
2. **NOTES:** Slides for each lecture will be posted in CANVAS or the Learning Web. It is your responsibility to access and print the slides if you wish. You **MAY NOT** share these files with anyone outside of class without express permission of the instructor, nor may you post any part online. You must take your own notes and read the textbook to do well in this class! Anything that we discuss in class including calculations is fair game for an exam.
3. **EXAMS:** Exams will be given at the beginning of class time and you will have 90 minutes to complete the exam. After the first exam has been completed, submitted, and that student has left the room, no more exams will be passed out. **DON'T BE LATE TO AN EXAM!** Restroom breaks are not allowed during the exam. Only **real** calculators may be used on exams. Use of phones or other smart tech is cheating.
4. **DUE DATES:** If you are absent for any reason, you will not be allowed to make up missed in-class assignments from that day. Late homework/lab assignments will be accepted up to the next class meeting. I **DO NOT** accept assignments via email.
5. **All phones and beepers must be turned off or be in silent (courtesy) mode.** You may not leave the room during a test to answer a phone call. Should this occur your test will be taken

up immediately. There will be no use of cell phones in the laboratory. I will allow the use of laptops in class, but only if you are using them for note taking purposes.

6. **LAB REPORTS:** Although you may discuss data with your lab partner(s), each lab report must be an individual effort (NO copying) and must be turned in separately when due, 10% of the course grade. The two formal lab reports will total 10% of the course grade. Unstapled lab reports and other assignments will not be accepted.
7. **LABORATORY SAFETY.** *Students are expected to abide by the rules of safety at all times during the laboratory exercises. Safety rules will be reviewed in the first lab session. NO EATING OR DRINKING OR SMOKING IN LABORATORY: No food or drinks are allowed in the laboratory. In addition, no smoking is allowed.*
8. **Genetic Disorder Seminar:** Each student should prepare and present one seminar during the last class period. I will explain what those entail in the second week. The presentations will total 10% of the course grade.
9. **STUDENT HANDBOOK-** important information for all students. Also contains the mission statement of the Houston Community College System (available online at HCCS home page.)
10. **GRADE DETERMINATION: (Use this to track your grades)**

| Your grade will be determined by the following | Details | Percent of Final Average |
|---|--|--------------------------|
| Lecture Exams | 4 Exams: T/F, multiple choice & others + choice of 4-5 written Qs to include: short answer, essay, overviews of processes, and solving various genetic problems. | 50% |
| Department Final | Covering topics from all Lecture Chapters | 10% |
| 2 Short "Formal" Mini-Lab Reports | Turned in following lab sessions Please neatly present all relative data and statistical tests and interpretations | 10% |
| Participation, workshops, homework problem sets | Lab and in classroom activities count to this section | 10% |
| Genetic Condition Oral Presentation (15 - 20 min) | 4 th Week (Friday) all day until finished | 10% |
| Lab worksheets / participation | Completed end of lab handout worksheets with all calculations, etc. clearly shown | 10% |
| Total: | | 100% |

The HCC grading scale is:

| | | |
|-----|--------------|----------------------------|
| A = | 100 – 90 | 4 points per semester hour |
| B = | 89 – 80 | 3 points per semester hour |
| C = | 79 – 70 | 2 points per semester hour |
| D = | 69 – 60 | 1 point per semester hour |
| F = | 59 and below | 0 points per semester hour |

| | | |
|-----|---------------------------------|----------------------------|
| FX | (Failure due to non-attendance) | 0 points per semester hour |
| IP | (In Progress) | 0 points per semester hour |
| W | (Withdrawn) | 0 points per semester hour |
| I | (Incomplete) | 0 points per semester hour |
| AUD | (Audit) | 0 points per semester hour |

To compute grade point average (GPA), divide the total grade points by the total number of semester hours attempted.

The grades "IP", "W", "AUD", "COM" and "I" do not affect GPA.

Incompletes The grade of "I" (Incomplete) is conditional. A student receiving an "I" must arrange with the instructor to complete the course work within six months of the end of the incomplete term. After the deadline, the "I" becomes an "F." Upon completion of the coursework, the grade will be entered as I/grade on the student transcript. All "I"s must be changed to grades prior to graduation.

Other Materials and resources:

Biology Lab Review Pages: <http://ctle.hccs.edu/biologylabs/index.html> You will get access to digital images, animations, and labeling exercises to review models, slides, and experiments that we cover in lab.

STEM Website for students: <http://www.hccs.edu/resources-for/current-students/stem--science-technology-engineering--mathematics/>

Great information on science clubs, seminars, symposium, and research opportunities that are available to HCC students. Check back often- updated regularly.

Tutoring: <http://ctle3.hccs.edu/alltutoring/>

Get expert one-on-one help, Online or In Campus, specifically for HCC students.

IMPORTANT DAYS

See calendar for exact date and time/ withdrawal, drop, holidays...etc. Also pay attention to HCC course withdrawal policy.

Jul 11th, 2019 Official date of record.

Aug 6th, 2019 Last class

Aug 7th, 2019 (Wed) Final Exam, 2hrs

The final withdrawal deadline for regular term is Jul 29th 2019 at 4:30pm. Classes of other duration (mini-term, flex-entry, 8-weeks, etc.) may have different final withdrawal deadlines. Please review HCC's online "Academic Calendars by Term" or contact the HCC Registrar's Office.

It's your responsibility to contact me regarding withdrawal prior to the withdrawal deadline; your absences or disappearance from the class doesn't mean you will receive a (W). You will receive a (W) only if you drop in the PeopleSoft System prior to the deadline.

Tentative Instructional Outline: *Note: Subject to Change*

MWF Lecture (topics by chapter/week) Please note each class week is ~11 hr of lecture (incl. after Exams)
~50 hrs

(Week 1) ~10 hrs

1. Introduction to Genetics, 30 min
2. Chromosomes and Cellular Reproduction, 1.5 hr
3. Basic Principles of Heredity, 1.5 hr
4. Sex Determination and Sex-Linked Characteristics, 1 hr
5. Extensions and Modifications of Basic Principles, 1.5 hr
6. Pedigree Analysis, Human Applications, and Genetic Testing, 1 hr

(Week 2) ~9 hrs (+ Exam 1, 2 hrs)

10. DNA: The Chemical Nature of the Gene, 1.5 hr (+ 3-D Printing Workshop)
9. Bacterial and Viral Genetic Systems, 1 hr
11. Chromosome Structure and Organelle DNA, 30 min
8. Chromosome Variation, 30 min
12. DNA Replication and Recombination, 1.5 hr
7. Linkage, Recombination, and Eukaryotic Gene Mapping, 1 hr

(Week 3) ~9 hrs (+ Exam 2, 2 hrs)

13. Transcription, 1.5 hr
14. RNA Molecules and RNA Processing, 45 min
15. The Genetic Code and Translation, 1.5 hr
16. Control of Gene Expression in Prokaryotes, 1 hr
17. Control of Gene Expression in Eukaryotes, 45 min
18. Gene Mutations and DNA Repair, 1 hr

(Week 4) ~9 hrs (+ Exam 3, 2 hrs)

20. Genomics and Proteomics, 1 hr (assign Fincher *et. al* (2018) pdf on: Planarian cell type transcriptome atlas and Plass *et. al* (2018) pdf on: Cell type atlas and lineage tree of a whole complex animal by single-cell transcriptomics)
21. Epigenetics, 30 min
22. Developmental Genetics and Immunogenetics, 1 hr (+ HHMI lecture on Developmental Genetics)
23. Cancer Genetics, 1 hr (+ HHMI lecture on Cancer)
25. Population Genetics, 1 hr (+ Workshop)
26. Evolutionary Genetics, 1 hr min

Friday, Individual Human Genetic Conditions Presentations, until Finished

(Week 5)

Wednesday, 7 Aug - Final Exam, 2hrs

TR Laboratory Schedule Please note Lab meets Tuesdays and Thursdays for about 7 hours each week.
Extra time will be used for other activities/workshops/lecture.~28 hrs

(Week 1)

Microscopy, Cells, Mitosis/Meiosis, 3 hrs
Karyotyping, 2 hrs

(Week 2)

Drosophila, P-gen to F1 (computer simulation of F2 with take home Chi-squared analysis & report) 2 hrs
Molecular Techniques, Micro-pipetting & Centrifugation, 2hrs
DNA Extraction, 2 hrs

(Week 3)

Part 1 of Transformation of Green fluorescence to *E.coli*, 3 hrs
PCR Basics / Part 1 of PCR based Lab: 1) GMO Product identification, or 2) Crime Scene Analysis Lab, 3 hrs
Analysis of Transformation of culture plates, (while waiting for gels) 1 hr

(Week 4)

PCR, Part 2, Gel electrophoresis of PCR Products, short formal lab report of analysis due next week, 3-4 hrs
Population & Evolutionary Genetics simulation, 2 hrs

Workshops/Problem solving (in lab TR and/or between lectures MWF w/ take home follow ups)

(Week 1)

3-6. Mendelian Genetics / Pedigree Problems, 1.5 hrs

(Week 2)

24. Quantitative Genetics /Statistics Problems, 1.5 hrs
DNA structure workshop, 1.5 hrs (using the 3-D printing facility)
7&19. Biotechnology, Genetic Engineering (intro to CRISPR), 1.5 hrs

(Week 3)

Exploring Genome Databases - take home project, 1-2 hrs
3-D Protein Structure, Amino Acids & Biochemistry, 1.5 hrs

(Week 4)

25&26. Population & Evolutionary Genetics lab simulations & Problems workshop, 2-3hrs

Student Services Policies: Access up-to-date Student Services Policies on their Web site:
<http://www.hccs.edu/resources-for/current-students/student-handbook/>

QUESTIONS/PROBLEMS: Please make sure that if you have any questions or problems at any time, that you first contact me as soon as possible. The worst thing you can do is wait to contact me or to not take advantage of the resources available to you. By taking an active part in your education, you will make your academic experience much more rewarding and exciting!!

EGLS₃ (Evaluation for Greater Learning Student Survey System)

- At Houston Community College, professors believe that thoughtful student feedback is necessary to improve teaching and learning. During a designated time near the end of the term, you will be asked to answer a short online survey of research-based questions related to instruction. The anonymous results of the survey will be made available to your professors and department chairs for continual improvement of instruction. For more information, go to <http://www.hccs.edu/resources-for/current-students/egls3-evaluate-your-professors/> .

REPEATING COURSES (THREE-PEAT RULE)

As a result of recent Texas legislative changes, please be advised that HCC is charging additional tuition for students who enroll in the same class three or more times at HCC. While it is the hope of HCC that students will be successful in their first attempt at classes, we realize that life demands, academic struggles, and other issues may result in students needing to take the same class more than once. Speaking with an advisor will help you develop student success skills, improving your overall academic performance. If a student repeats a course in which a grade (A-F) has been received, the highest grade received at HCC is the permanent grade for the course and will be used in computing the GPA. All grades earned in a given course will be reflected on the transcript. Other colleges may compute the GPA differently than HCC.

COURSE WITHDRAWALS (6-Drop Rule)

Students must withdraw by the withdrawal deadline in order to receive a “W” on a transcript. Final withdrawal deadlines vary each semester and/or depending on class length, please visit the online Academic Calendar, any HCC Registration Office, or any HCC advisor to determine class withdrawal deadlines.

Be certain you understand HCC policies about dropping a course and consult with a counselor/advisor to determine if withdrawing is in your best interest. It is your responsibility to withdraw officially from a class and prevent an “F” from appearing on your transcript. Senate Bill 1231 limits the number of W’s a student can have to 6 classes over the course of their entire academic career. This policy is effective for students entering higher education for the first time in fall 2007 and subsequent terms. Withdrawals accumulated at any other Texas public higher education institution count toward the 6 course total. Withdrawals for certain circumstances beyond the students control may not be counted toward the 6-drop limit.

In addition, withdrawing from a course may impact your financial aid award or eligibility. Contact the Financial Aid Office or website to learn more about the impact of withdrawing on financial aid.

HCCS IS COMMITTED TO YOUR SUCCESS

Early Intervention Program and Services

Your success is our primary concern! If you are experiencing challenges achieving your academic goals, please contact your instructor or an early intervention coach. We can provide assistance with academic needs, ADA accommodations, classroom difficulties, financial concerns, and other issues.

Tutoring

HCCS provides free online and on campus tutoring for all HCC students. Go to <http://ctle3.hccs.edu/alltutoring/>

Counseling Services

Counseling services are available to students who are experiencing difficulty with academic issues, selection of college major, career planning, disability accommodations, or personal issues. <http://learning.hccs.edu/programs/counseling>

Accommodations due to a qualified disability

HCC strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please meet with a campus Abilities Counselor as soon as possible in order to establish reasonable accommodations. Reasonable accommodations are established through an interactive process between you, your instructor(s) and Ability Services. It is the policy and practice of HCC to create inclusive and accessible learning environments consistent with federal and state law. For more information, please go to <http://www.hccs.edu/district/students/disability-services/>

ACADEMIC INTEGRITY

This instructor is committed to a high standard of academic integrity in the academic community. In becoming a part of the academic community, students are responsible for honesty and independent effort. Failure to uphold these standards includes, but is not limited to, the following: plagiarizing written work or projects, cheating on exams or assignments, collusion on an exam or project, and misrepresentation of credentials or prerequisites when registering for a course. Cheating includes looking at or copying from another student's exam, orally communicating or receiving answers during an exam, having another person take an exam or complete a project or assignment, using unauthorized notes, texts, or other materials for an exam, and obtaining or distributing an unauthorized copy of an exam or any part of an exam. Plagiarism means passing off as his/her own the ideas or writings of another (that is, without giving proper credit by documenting sources). Plagiarism includes submitting a paper, report, or project that someone else has prepared, in whole or in part. Collusion is inappropriately collaborating on assignments designed to be completed independently. These definitions are not exhaustive. When there is clear evidence of cheating, plagiarism, collusion, or misrepresentation, disciplinary action may include but is not limited to requiring you to retake or resubmit an exam or assignment, assigning a grade of zero or "F" for an exam or assignment; or assigning a grade of "F" for the course. Additional sanctions including being withdrawn from the course, program or expelled from school may be imposed on a students who violate the standards of academic integrity.

STUDENT BEHAVIOR EXPECTATIONS

Students are expected to conduct themselves appropriately while on College property or in an online environment. The instructor would institute established HCCS disciplinary action. Students who pose a threat to the safety of others will be subject to immediate withdrawal from the classroom. Please refer to the HCC Student Handbook.

COMPUTER VIRUS PROTECTION

Computer viruses are, unfortunately, a fact of life. Using removable devices on more than one computer creates the possibility of infecting computers and diskettes with a computer virus. This exposes the computers of the college, your personal computer, and any others you may be using to potentially damaging viruses. The college has aggressive anti-virus procedures in place to protect its computers, but cannot guarantee that a virus might not temporarily infect one of its machines. It is your responsibility to protect all computers under your control and use and ensure that each diskette

you use, whenever or wherever you use it, has been scanned with anti-virus software. Since new viruses arise continually, your anti-virus software must be kept current. And, since no anti-virus software will find every virus, keeping backup copies is extremely important.

EQUAL OPPORTUNITY STATEMENT It is the policy of the HCCS to provide equal employment, admission and educational opportunities without regard to race, color, creed, national origin, gender, age, veteran's status, sexual orientation, or disability.

FERPA The academic, financial and non-directory information on your student account is confidential and protected by the Family Educational Rights & Privacy Act (FERPA). We cannot release certain information to another person without your written authorization. Further information regarding Student Records and FERPA can be found at; <http://www.hccs.edu/district/about-us/procedures/student-rights-policies--procedures/>

HCC Policy Statement: Sexual Misconduct

TITLE IX OF THE EDUCATION AMENDMENTS OF 1972, 20 U.S.C. A§ 1681 ET. SEQ.

Houston Community College is committed to cultivating an environment free from inappropriate conduct of a sexual or gender-based nature including sex discrimination, sexual assault, sexual harassment, and sexual violence. Sex discrimination includes all forms of sexual and gender-based misconduct and violates an individual's fundamental rights and personal dignity. Title IX prohibits discrimination on the basis of sex-including pregnancy and parental status-in educational programs and activities. If you require an accommodation due to pregnancy please contact an Abilities Services Counselor. The Director of EEO/Compliance is designated as the Title IX Coordinator and Section 504 Coordinator. All inquiries concerning HCC policies, compliance with applicable laws, statutes, and regulations (such as Title VI, Title IX, and Section 504), and complaints may be directed to:

David Cross, Director EEO/Compliance

Office of Institutional Equity & Diversity

3100 Main, Houston, TX 77266-7517 or Houston, TX 77266-7517

(713) 718-8271

or Institutional.Equity@hccs.edu

Basic Needs

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable us to provide any resources that HCC may possess.

HCC Campus Carry

At HCC the safety of our students, staff, and faculty is our first priority. As of August 1, 2017, Houston Community College is subject to the Campus Carry Law (SB11 2015). For more information, visit the HCC Campus Carry web page at <http://www.hccs.edu/departments/police/campus-carry/>

FINAL EXAMINATIONS

A final evaluation activity will occur during the published final evaluation period. The appropriate dean, director, or department chair must approve any variation to this schedule.

DISCLAIMOR: It is your responsibility to read the syllabus in its entirety by the second class period and contact the Instructor if you have any questions and/or need clarifications.