MCB 2400
Human Genetics
Syllabus – Summer 2026

Excluding materials for purchase, syllabus information may be subject to change. The most up-to-date syllabus is located in HuskyCT: Course Content

Course and Instructor Information

Summer Session 1

Modality:
On-line Blended: *Synchronous* content is remote via WebEx M-F* from 10am-12pm EST
Asynchronous content is via HuskyCT within 24hrs of active learning

*A brief course schedule is found at the end of this syllabus but a more detailed and updated schedule is posted in HuskyCT. Any such changes will be communicated via UConn e-mail and posted in the HuskyCT Announcements / "Working Schedule"

Course Title: MCB 2400 Human Genetics
Credits: 3
Format: On-line active learning with integrated and asynchronous discussion activities
Prerequisites: BIOL 1107. Not open for credit to students who have passed MCB 2400. May not be taken out of sequence after passing MCB 3220, 3400, 3410, 3412, 3413, 3843W, or 4416.

Instructor:	Dr. Justin Kratovil
Office Address:	TLS 416 (during regular semesters)
Email:	Justin.Kratovil@uconn.edu
Office Phone:	N/A (during summer session)
Office Hours:	By appointment via Nexus: M-F 12-1pm via WebEx
Course Website:	https://lms.uconn.edu/ultra/courses/_175084_1/outline
WebEx Room URL:	https://uconn-cmr.webex.com/meet/juk19004

Course Description

Foundational principles of classical genetics and modern genomics with a specific focus on humans. Emphasis on case studies and applications to human genetic diseases.

Welcome to MCB 2400 Human Genetics!

This course is divided into four modules that survey the fundamental principles of genetics which include 1) Transmission genetics, 2) the Central Dogma of molecular genetics, 3) Functional genomics, and 4) Evolutionary genetics – all with a focus on humans.

Course and Learning Objectives

By the conclusion of this course, students will be able to:

1. Differentiate and analyze patterns of inheritance and trait variation
    - Compare single-gene, polygenic, and complex traits, and evaluate how genes and environment interact to influence phenotypes.
2. Explain and illustrate molecular processes of the central dogma
    - Describe DNA structure and replication, outline transcription and translation steps, and interpret mechanisms that regulate gene expression.
3. Apply and assess genetic technologies in research and medicine
    - Explain sequencing strategies, compare gene editing methods, and evaluate the benefits and limitations of genetic testing and genomic medicine.
4. Calculate and predict evolutionary changes using population genetics principles
    - Use Hardy-Weinberg equilibrium to compute allele frequencies and analyze how microevolutionary forces shape genetic diversity.

Expectations and Accountability:

Students are encouraged to use critical thinking to question, explore, and guide their own learning throughout the semester, and to share insights that enhance class learning. Lecture-scaffolded active learning and discussions are designed to clarify, reinforce, and build upon material rather than introduce new genetic concepts. Students are expected to prepare for class by completing scheduled SmartBook reading assignments in advance. This preparation will allow us to briefly review essential material at the start of class, address misconceptions, and actively apply knowledge through peer discussions and activities aimed at higher-level learning goals.

Students will also work collaboratively in small groups to research relevant genetics topics and create Human Genetic Reports (HGRs), which will be presented and recorded in advance (asynchronous learners), or delivered at the beginning of lecture (synchronous learners). These projects will broaden the range of topics explored and strengthen communication skills for all participants.

Successful learning in this course will require careful planning, time management, active reading, engagement with material, effective communication, collaboration, and processing information through strategies such as outlining and concept mapping. Both students and instructors are expected to maintain courtesy and respect, actively listen, participate in peer learning and group activities, and communicate concerns promptly and professionally.

Our adaptive online textbook uses an evidence-based approach to improve learning when combined with course materials available in HuskyCT. Consistent participation in classrooms,

discussions, office hours, and engagement with digital and non-digital resources will reinforce comprehension. Students will complete practice questions and SmartBook quizzes to monitor understanding and will apply concepts through genetics assignments. Comprehension and application of material will also be assessed through remote examinations.

By the end of the course, students should have a deeper appreciation and understanding of human genetics and its profound impact on daily life, future careers, personal health, and the life sciences.

Course Materials

Textbook:

Human Genetics: Concepts and Applications, Ricki Lewis, 14th edition, McGraw Hill LLC
ISBN10: 1265351287 | ISBN13: 9781265351281

Connect online platform for the text **Human Genetics: Concepts and Applications**, Ricki Lewis, 14th edition, McGraw Hill LLC
ISBN10: 1266106723 | ISBN13: 9781266106729

SmartBook and an optional physical textbook can be purchased directly through the publisher's website or through the UConn bookstore. With this access a digital version of the text is accessible (it is downloadable for off-line use).

Student Registration and Support

- Connect/Blackboard Student Registration Instructions (IA)

Tech Support:
For technical support, please contact McGraw Hill's **Customer Experience Group (CXG):**

- Phone: 1-800-331-5094; Live chat/email: https://mhedu.force.com/CXG/s/ContactUs

Mon-Thu: 24 Hours, Fri: 12 AM-9 PM, Sat: 10 AM-8 PM, Sun: 12 PM-12 AM (All Times Eastern USA)

Digital materials required for this course have been integrated with HuskyCT and is found in the "**Course Content**" link on the left side menu. Please sign into HuskyCT to access your course and course materials. While it is possible to complete assignments within Connect, I highly advise using the links within HuskyCT to ensure all grades are up to date and synchronized properly. You will need to purchase access for the digital material using a single e-mail account

Course Outline

Module 1: Transmission Genetics
Chapters 1-7 & 13
Module 2: Central Dogma of Molecular Genetics
Chapters 9-12
Module 3: Functional and Applied Genetics & Genomics
Chapters 9, 14, 20-22
Module 4: Evolutionary Genetics
Chapters 15-16

How to Succeed in this Course

Lesson objectives for lectures and discussion are based on the most pertinent topics in this field and are posted in HuskyCT and within lecture slides ahead of class. Ideally, you will 1) review lesson objectives in SmartBook and complete the adaptive reading comprehension questions prior to class and actively read associated sections. Before attending lectures, I encourage you to 2) print slides, prepare active reading questions, and take notes. In class, 3) actively listen and participate, taking notes on slides that we cover. After class, 4) reorganize your notes to generate a more complete outline of material and relationships. 5) Watch recorded lectures to help solidify concepts and connections between chapters. 6) Generate questions while reviewing material to help test your knowledge and validate your understanding. 7) Find a cohort of students to study with and keep each other accountable. 8) Don't allow yourself to fall behind!

Each week in class, we will discuss context and strategies for learning, go through problem sets applying the concepts learned. Concepts and terminology are important as a foundation for solving unfamiliar problems and applications, showcasing a validating comprehension. 9) Use SmartBook and practice quizzes to prepare for exams. 10) Schedule and attend office hours even if you are not struggling (and definitely if you are struggling!).

Course Requirements and Grading

Summary of Course Grading:

	Weight
Course Components	**Non-honors**
SmartBook Activities: reading questions (20 points), assignments (9 points), extra credit (3 points)	10%
SmartBook Activities: quizzes (100 points), optional/replacement quizzes (20 points)	10%
Participation (ARS: e.g. Slido, discussion)	15%
Honors Activities	--
Human Genetic Report: group/topic (2 points), fact sheet (3 points), write-up (9 points), presentation (6 points)	10%
Exams (lowest x1) @10% (highest x2) @15% each	40%
Cumulative Final	15%

* Students participating in an Honors Conversion must complete >80% of Honors Activities

SmartBook Activities:

Pre-class reading/content questions: SmartBook has been curated to help you sufficiently prepare a basic understanding of core lecture content before class and each assignment is estimated to take approximately 30-45 minutes on average to complete. Individually, these are low stake reading assignments worth 1 point each and **must be submitted the night before class**. Extensions are arranged on a case-by-case basis. The SmartBook textbook provides great examples and natural extensions for context, but I will not ask you to memorize case studies in SmartBook unless they are also covered in lecture or described in a HGR. Each module also contains higher stake assignments due before the exam, worth 3 points each with more elaborate activities on heredity, PCR, and sequencing which will help you apply this information in preparation for the exam.

Lastly, there are multiple on-line/remote quizzes worth approximately 10 points each to help you assess your understanding of material in preparation for the exam. Quizzes consist of questions drawn from material covered during the week and completion should take approximately 15-20 minutes (but you will have between 30-45 minutes depending on depth of content and number of questions). We intentionally stagger quizzes from initial exposure to content to improve long term learning outcomes. These timed quizzes become available in the morning and must be completed individually using Proctorio lockdown browser before 11:59pm. You may use your prepared notes and course textbook, however notes taken on a device used for the quiz may not be accessible in Lockdown browser during the assessment, so plan accordingly. Lowest quizzes may be dropped or replaced for credit if additional quizzes are offered during the semester.

Active Participation (via audience response system):

We use an audience response system during lecture and discussion (Slido) to help monitor and improve learning objectives. Slido can be accessed via mobile phone apps and Internet accessible devices. Credit will be earned for participating in these activities (whether or not the answer is correct), but in order to obtain credit, students must register their responses using their username (aka NetID) from HuskyCT that is associated with their UConn affiliated e-mail address, **no exceptions**.

Students must participate in at least 80% of total activities offered for full participation credit and participation credit cannot exceed 100%. For example, if a student participates in 6/10 activities,

their adjusted participation is 60% / 80% and they will earn 75% participation credit. If a student participates in 9/10 activities, their adjusted participation is 90% / 80% and they will earn no more than 100% participation credit.

Synchronous and asynchronous participation (via Slido) cannot normally be made up outside of the scheduled window for participation (24 hrs after class content is available). Students unable to participate in lecture/discussion for any reason (e.g., because of sickness, failing to register correctly in Slido, technical problems with the app/website, participation in university sanctioned or professional events, or otherwise voluntarily "opting out" of activities) are all included in the 20% non-participation grace permitted. We will update participation during the first week and periodically throughout the semester, but you are responsible for retaining e-mails from Slido for credit verification in case of irregularities.

Students unable to attend class for an extended period of time (approximately 1 weeks total) or with a medical accommodation preventing participation, should contact the Dean of Students and we will arrange alternative assignments or accessibility options on a case-by-case basis.

Occasionally, you may be asked to submit copies of small group assignments to HuskyCT for credit and individuals named on the submission will receive equal credit.

Honor's Course or Conversion:

The honors activities are usually based on reading and responding to a weekly book discussion which is graded as part of honor's participation activities. I will have more information about this discussion during week 1. Possible material (subject to change) is below.

Possible Honor's Section: Weekly Reading and On-Line Discussion Responses

Mukherjee, S. (2017). *The Gene: An Intimate History.* Michigan, Large Print Press.

ISBN: 978-1-4328-3781-5

Human Genetics Report:

Students will collaborate in pairs to research and prepare 1) a short 4 page review paper (double spaced, size 12 font, excluding references), 2) a 1 page "fact sheet", and 3) record or present in-class a 3 minute "lightning talk" on a topic related to human genetics. Topics and groups will be determined during the 1st week of class, and projects will be due weekly starting on week 3.

The topic chosen should focus on the genetics of a trait or characteristic, congenital abnormality, acquired or inherited disease, clinical or pathological condition of their choice, or important ethical issue in human genetics. Other topics may be approved on a case-by-case basis. Additional information will be presented during the 1st week of the course, and more details can be found in HuskyCT. The presentation and write up are worth 10% of your grade and include credit for forming groups/determining topics, submitting outlines or "fact sheets" shared with peers, delivering presentations, and submitting a formal write-up.

Exams 1-3:

Exams for each module will be administered through HuskyCT and will require Respondus Lockdown Browser. We will not meet for lecture on the date of the exams (usually Fridays). Exams are not open-book or open-notes. These assessments will contain applied and analytical questions found in discussion and practice quizzes but also include questions requiring you to recall and evaluate material from SmartBook. These exams will include approximately 30 multiple choice, matching, or true-false questions. Each exam will be available at approximately 7am on the scheduled exam date. Once you start the exam, you will have 1 hour to complete the assessment. Exams submitted after the 11:59pm deadline will be counted as late. Late exams will be penalized -10% for each day late, unless you have a previously approved excuse (see below).

Content for exams: You are responsible for understanding material (and logical extensions of this material) covered during pre-lecture SmartBook activities/assignments/quizzes, lecture, discussion, and "Fact Sheets" from HGRs. Our SmartBook textbook has enough material for two semesters, but you are only responsible for the sections and subsections that are addressed in this course.

Final Exam:

The Final Exam will be cumulative but with an emphasis on advanced topics from Module 4. We will not meet in person on the date of the exam. The final will be administered through HuskyCT and will require Respondus Lockdown Browser. This final is not open book or open notes. Final exams can only be rescheduled with permission from the Dean of Students office. Unless you get permission to take the exam on another date, you must take the Final as scheduled.

Makeup Quizzes and Exams: If you are unable to take a quiz or regularly scheduled exam due

to illness or extenuating circumstances, contact the instructor as soon as possible to reschedule without penalty. Be proactive so we can accommodate academic, professional development, and athletic events. Typically, the oldest make up assignments must be completed within 1 week of returning to campus, extending for the duration of the absence, if possible, so the late work isn't overwhelming.

Grading Scale:

Grade	Letter Grade	GPA
93-100	A	4.0
90-92	A-	3.7
87-89	B+	3.3
83-86	B	3.0
80-82	B-	2.7
77-79	C+	2.3
73-76	C	2.0
70-72	C-	1.7
67-69	D+	1.3
63-66	D	1.0
60-62	D-	0.7
<60	F	0.0

Due Dates and Late Policy

All course due dates are identified in the Course Schedule on HuskyCT using Eastern Standard Time. *The instructor reserves the right to change dates accordingly as the semester progresses. All changes will be communicated in an appropriate manner during lecture or e-mail and noted on the schedule in HuskyCT.*

Late submissions:

Assignments submitted late will be penalized -10% for each day late.

Late Quizzes are penalized -10% per day.

Late Exams are penalized -10% per day.

Participation activities and extra credit offered cannot be submitted late.

Lockdown Browser and Respondus Monitor.

When taking your exams on HuskyCT you will be required to use the Lockdown browser and have a camera and microphone on your device. Contact UConn technology serves ASAP if you encounter a device failure, as loaners may be in limited supply. A lockdown browser is a

necessary and routine component of remote test taking. To avoid any problems please do the following:

When asked to show your environment, **please show your *entire* environment**.

1) You must provide identification to validate your identity when taking a proctored exam. A valid UConn ID is the preferred form of identification.
2) You may use scrap paper but show both sides of the blank paper to your camera.
3) To avoid being 'flagged for review" try to keep your full face in frame during the whole assessment and remove or cover images of other individuals in your background. The software will provide guidance and warnings if needed.
4) If you need to leave your environment (*e.g.* to use the restroom), please don't take any materials with you and leave your phone off and at your desk.
5) If you are not cheating (using outside sources during the assessment) you have nothing to worry about. We are simply trying to make sure that everyone is on equal ground when taking the assessments.

Weekly Time Commitment

You should expect to dedicate approximately **27 hours a week to this course**. This expectation is based on the various course activities, assignments, and assessments and the University of Connecticut's policy regarding credit hours. More information related to hours per week per credit can be accessed at the Online Student website.

Students with Disabilities

The University of Connecticut is committed to protecting the rights of individuals with disabilities and assuring that the learning environment is accessible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let me know immediately so that we can discuss options. Students who require accommodations should contact the Center for Students with Disabilities, Wilbur Cross Building Room 204, (860) 486-2020 or http://csd.uconn.edu/.

Blackboard measures and evaluates accessibility using two sets of standards: the WCAG 2.0 standards issued by the World Wide Web Consortium (W3C) and Section 508 of the Rehabilitation Act issued in the United States federal government." (Retrieved March 24, 2013 from Blackboard's website)

Student Responsibilities and Resources

As a member of the University of Connecticut student community, you are held to certain standards and academic policies. In addition, there are numerous resources available to help you succeed in your academic work. Review these important standards, policies and resources, which include:

The Student Code
  - Academic Integrity
  - Resources on Avoiding Cheating and Plagiarism
- Copyrighted Materials
- Credit Hours and Workload
- Netiquette and Communication
- Adding or Dropping a Course
- Academic Calendar
- Policy Against Discrimination, Harassment and Inappropriate Romantic Relationships
- Sexual Assault Reporting Policy

Software/Technical Requirements (with Accessibility and Privacy Information)

The software/technical requirements for this course include:

HuskyCT/Blackboard (HuskyCT/ Blackboard Accessibility Statement, HuskyCT/ Blackboard Privacy Policy)

- Adobe Acrobat Reader (Adobe Reader Accessibility Statement, Adobe Reader Privacy Policy)
- Dedicated access to high-speed internet with a minimum speed of 1.5 Mbps (4 Mbps or higher is recommended).
- **SmartBook (Mcgraw Hill / HuskyCT)**
- **Device for taking exams and quizzes that is also equipped with microphone and camera with UConn's Lockdown browser installed.**

For information on managing your privacy at the University of Connecticut, visit the University's Privacy page.

NOTE: This course has NOT been designed for use with mobile devices. However, Slido is mobile compatible.

Help

Technical and Academic Help provides a guide to technical and academic assistance.

This course is facilitated online using both the learning management platform, HuskyCT, and the online companion to your text SmartBook/Connect. If you have difficulty accessing HuskyCT, you have access to the in person/live person support options available during regular business hours through the Help Center. You also have 24x7 Course Support including access to live chat, phone, and support documents. If you have issues with Achieve, please contact the MacMillan Learning tech support available through the Achieve website.

Minimum Technical Skills

To be successful in this course, you will need the following technical skills:
Use electronic mail with attachments.

- Save files in commonly used word processing program formats.
- Copy and paste text, graphics or hyperlinks.
- Work within two or more browser windows simultaneously.
- Open and access PDF files.

University students are expected to demonstrate competency in Computer Technology. Explore the Computer Technology Competencies page for more information..

Evaluation of Course Experience

Students will be given an opportunity to provide feedback on their course experience and instruction using the University's standard procedures, which are administered by the Office of Institutional Research and Effectiveness (OIRE).

The University of Connecticut is dedicated to supporting and enhancing teaching effectiveness and student learning using a variety of methods. The Student Experience of Teaching (SET) is

just one tool used to help faculty enhance their teaching. The SET is used for both formative (self-improvement) and summative (evaluation) purposes.

Additional informal formative surveys and other feedback instruments may be administered within the course.

Copywrite information

My lectures, notes, handouts, and displays are protected by state common law and federal copyright law. They are my own original expression and I've recorded them prior or during my lecture to ensure that I obtain copyright protection. Students are authorized to take notes in my class; however, this authorization extends only to making one set of notes for your own personal use and no other use. I will inform you as to whether you are authorized to record my lectures at the beginning of each semester. If you are so authorized to record my lectures, you may not copy this recording or any other material, provide copies of either to anyone else, or make commercial use of them without prior permission from me.

Preliminary Schedule: **Course Overview and General Calendar (subject to change as necessary). See *Official Working Calendar* in HuskyCT for more details**

Week	Date	Chapters	Lecture/Discussion Topics	Assessments	Notes
1	6/1	Introduction; Ch.1	Introduction and Overview of Course		Summer semester begins
1	6/1	Ch. 2.1; 2.3	Review: Mitosis, Meiosis, & the cell cycle	"Syllabus and Respondus Software" Quiz (on HuskyCT)	This is the **only** open book/notes quiz that can be repeated
1	6/2	Ch. 3.2, 13	Chromosome variation and Cellular Reproduction	Quiz 1: Cellular Reproduction	All SmartBook quizzes are open book/notes
1	6/3	Ch. 4	Mendelian genetics and applications	Quiz 2: Chromosomes & Non-Disjunction	Last day to withdraw without a "W"
1	6/4	Ch. 5	Extensions on Mendelian genetics	Quiz 3: Heredity and Pedigrees	
1	6/5	Ch. 6	More extensions and complex traits	Quiz 4: Extensions & Linkage	
2	6/8		*** No Lecture (Remote Exam 1) ***	**Exam 1: Chapters 1-6 & 13**	
2	6/9	Ch 7	Complex traits / Quantitative genetics		
2	6/10	Ch 9	DNA: discovery, structure, and replication	Quiz 5: Quantitative Genetics	
2	6/11	Ch. 10	RNA molecules and RNA processing	Quiz 6: DNA discovery, structure, replication	
2	6/12	Ch. 10, 11	Translation, protein synthesis, expression	Quiz 7: Transcription and Translation	
3	6/15		*** No Lecture (Remote Exam 2) ***	**Exam 2: Chapters 7, 9-10 (HGRs 3-5 & 7D#2-3)**	
3	6/16	Ch 12	Mutations, damage repair, & regulation		
3	6/17	Ch 9.3; 9.4; Ch 21, 22	Molecular genetic technologies	Quiz 8: Regulation & Mutation	
3	6/18	Ch. 21.2-4; 22.1-2	Molecular genetics and genomics	Quiz 9: PCR & Sequencing	

4	4/22		*** No Lecture (Remote Exam 3) ***	**Exam 3: Chapters 11,12, 9.3-9.4, 21-22 (HGRs 6-10, 7D #4-6, 8D)**	Last day to withdraw from course
4	4/23	Ch. 20	Cancer and applied genetics	Quiz 10: Cloning and Genomics	
4	4/24	Ch. 15	Population genetics	Quiz 11: Cancer genetics	Last day of fall semester classes
4	4/25	Ch. 16	Evolutionary genetics	Quiz 12: Population genetics	
4	4/26		Exam Review		
5	4/29-5/1	*Final Exam* date/time TBD		**Final Exam (75% Comprehensive & 25% Material from Chapters 14, 20, 15-16)**	