

# BILD 20: Human Genetics and Modern Society

## Summer Session I 2023

Lecture: MW 8 am to 10:50 am Peterson Hall 102

Discussion Sections: TuTh 8 am to 8:50 am and 9 am to 9:50 am York 3000A

### Welcome to BILD 20

<b>Course Description</b>	This course will introduce students to fundamentals of genetics, principles of inheritance and applications of genetics to various areas including forensic science, genetic screening, athletics. This course is open for non-biology majors only and it is my hope that by the end of the quarter you will be able to appreciate, and hopefully get fascinated by the incredible and vast field of genetics.
<b>Credits</b>	4
<b>Instructor</b>	Deepam Gupta (Ph.D. Candidate in Biological Sciences) <a href="mailto:dgupta@ucsd.edu">dgupta@ucsd.edu</a> Office hours: Wednesday 4 pm to 5 pm Friday 10 am to 11 am <a href="#">Bonner Hall</a> 2140
<b>IAs</b>	Tyler Scramaglia <a href="mailto:tscramaglia@ucsd.edu">tscramaglia@ucsd.edu</a> Sahiti Yeturu <a href="mailto:syeturu@ucsd.edu">syeturu@ucsd.edu</a>

### Broad Learning Outcomes

Upon completion of this course, students will be able to:

1. Explain general biology concepts that are needed to understand genetic principles and techniques.
2. Identify how gene mutations are propagated across generations and recognize patterns of inheritance.
3. Develop an understanding of genetics of complex diseases like cancer.
4. Critique and comment on the science behind various issues surrounding popular genetics-related news articles and developments.

*More detailed, topic-specific learning outcomes will be provided in each lecture*

### Textbook and Readings

I do not require any textbook for this course. There are several free online resources (including videos) that will be provided as needed. If you prefer a textbook, *Essentials of Genetics* (any edition from 8<sup>th</sup> onwards) by Klug et al. can be an excellent resource for

learning about relevant topics. *Note that the book is quite detailed and contains topics that we will not be covering in this class.*

At various points in the course, I will provide you with interesting popular articles based on the topics that we will be covering in the lecture. **Two** of these readings will be **required readings** as we will have class discussions and assessment questions based on them. I will also provide other optional readings. I highly recommend reading these as these short readings are limited on scientific jargon and many of them read as interesting stories. These will enhance your understanding of the concepts we learn in class and help you connect your knowledge from class with policies and events in the world.

### **How this class will work:**

To do well in this class, you **do not** need to memorize terminologies and definitions, but be familiar with them. The course is designed to encourage collaboration and peer learning. Genetics involves processing given information and using it to solve given problems. Throughout the course, I will be providing you with several such problems and will also discuss strategies to solve them. In exams you will be asked to apply the fundamental knowledge you have learned in the class to solving problems.

There are various components of the course:

**Lectures:** Lectures will be held **in-person** on Monday and Wednesday from 8 am to 10:50 am in Peterson Hall 102. The lectures will be podcasted, and the recordings will be available few hours after the class are over. It is **highly recommended** that you attend the lectures. A lot of learning will happen during the lecture time and can reduce your workload later in the week. Each class will have at least one group activity that will involve either problem solving or discussion. **A portion of your final grade will be based on these in-class activities.** As these are group activities, it is not possible to make up for them if you fail to attend the class. You will be allowed to miss **two** lectures before you start losing points for these in-class activities to allow for emergencies and illness.

**Discussion Sections:** Discussions sections will be held on Tuesday and Thursdays from 8 am to 8:50 am and from 9 am to 9:50 am in York 3000A. **There will be no discussion section on Tuesday, July 4<sup>th</sup>.** Your first discussion section will be on Thursday, July 6<sup>th</sup>. In the discussion section, the IAs will review some lecture material and help answer your questions. You will also be solving a problem in groups that is related to the content we have covered in the class. **This will count as your participation in the discussion section and contributes to your final grade.** You will be allowed to miss **two** discussion sections before you start losing participation points to allow for emergencies and illness.

**Weekly familiarity quizzes:** As you are aware, the summer quarter is extremely short, and it is very easy to fall behind. To help you stay on track with the lectures and the required readings, you will complete short canvas-based quizzes (total 4, no quiz in the final week) that will test your understanding on some concepts which we have covered in the class. The level of the quizzes will be on the easier side and will help you assess

your understanding as we go along the course. These quizzes will have multiple-choice or short answer questions and are **open-book/open-notes**. You will have **two attempts** for each of the quizzes and the highest score will be chosen as your final grade. The quizzes will open on **Thursday 11 am** and you have until **Saturday 11:59 pm** to take the quiz. Once you start an attempt you will have **30 minutes** to complete it. You will be able to view your score but not the correct answers after your attempt and you can retake the quiz. There are **no late submissions** allowed.

**Homework assignments:** Weekly homework assignments are a crucial component of the course as they will provide you with necessary practice for your exams. Homework questions are typically at a higher difficulty level than weekly quizzes. The purpose is to practice applying knowledge of course concepts and to solve problems. You can expect similar questions in your tests. In total there will be **five** assignments (**lowest one would be dropped**) and will be due on every **Sunday 11:59 pm** (except for final week when the assignment will be due on **Thursday August 3<sup>rd</sup> 11:59 pm**). You will upload the assignment on GradeScope on Canvas. You are allowed and encouraged to discuss the assignment with your peers. Ultimately, however, the assignment should be **your own work**, and you are not allowed to copy answers from other students. Points for late homework will be deducted by 10% each day they are late. However, I do understand that life happens and if you need an extension for any reason, please let me and your IA know, and we will do our best to accommodate you.

**Midterm and Final:** The midterm for the course will be held **in-person** on **Wednesday July 19**, from 8 am to 9:30 am during the lecture time. The syllabus will be limited to topics we cover in the class until **July 12**. The exam will be **open book and open-notes**, but you are not allowed to discuss questions with your peers. The difficulty and the format of the questions will be similar to problems in the homework assignments. The final of the course is scheduled on **Friday August 4**, from **8 am to 10:59 am**. This will also be an open book and open notes exam. The final exam will be **cumulative**, but **more weight** will be given to topics that were covered after the midterm.

**Missed Exams:** Alternate midterm exam will only be scheduled in the case of an emergency. Please check your schedule to ensure that you have no clashes. You are responsible for clearing the absence from the exam with me before the exam date (unless it is an extreme emergency that can be documented in which case, I must be notified within 24 hours). In the case of a missed final exam, you will be asked to provide documentation to both me and the Dean of Academic Affairs and/or Student Affairs of your college. Upon receipt of documentation, it will be determined if you can receive a grade of "Incomplete" ("I"). Students with an incomplete will have the opportunity to take a final exam at a later date – set by the instructor. **You must have a passing grade in the course to be eligible for an Incomplete** (in addition to the approved reason and documentation noted above).

**Practice Problems:** I will also be providing you with practice problem sets that will be of similar level of difficulty to that of homework assignments and exams. These are **not required** to be submitted and are for additional practice. **I highly recommend solving**

**these problem sets** as more and more practice will help you in this course. The instructional team will always be available to go over the practice problems with you in the office hours.

**Grading and Distribution:**

My teaching philosophy is that everyone learns differently and circumstances including, but not limited to family and personal emergencies, illnesses can significantly affect one’s ability to learn. Hence, your grade will be based on multiple components throughout the course with flexibility in many of them as has been described above. Below are the weight for each component

Assessment	# of assessments	Total Points	% of final grade	Due date
In-class activities	10 (two activities can be dropped)	80	8	At the end of each class
Discussion section participation	9 (two can be dropped)	70	7	At the end of each discussion section
Weekly quizzes	4	100	10	Saturday 11:59 pm
Homework assignments	5 (lowest one will be dropped)	200	20	Sunday 11:59 pm (except for #5, which is due on August 3 <sup>rd</sup> , Thursday 11:59 pm)
Midterm exam	1	250	25	
Final exam	1	300	30	

**Extra credit opportunities:**

	Points
Pre-class survey	10
Literature piece on an optional reading*	10
>95% CAPE response	20

\*Among many of the optional readings assigned, you can submit **one literature piece** (two pages maximum, arial 12 font, double spaced). Instructions for the exact content will be unique for each optional reading and will be communicated when the reading is uploaded.

**Grading scale:**

950-1040	A+	800-849	B+	670-699	C+	570-599	D+
900-949	A	750-799	B	630-669	C	530-569	D
850-899	A-	700-749	B-	600-629	C-	500-529	D-

**General grading policies:**

1. The class will **NOT be curved**. I do not want you to compete but work together to excel in the course. The grading scale described above can be changed such that the cutoffs are lower for every grade. The cutoffs will NOT be increased in any circumstances.
2. For regrading assignments, submit your requests via Gradescope. For midterm, submit your answer sheet within 48 hours after receiving it with a reason of why regrading is requested. Students who submit items for re-grading understand that the instructor may re-grade the entire test/homework and the score may go up or down. Due to tight deadline for grade submissions after the finals, it will not be possible to regrade the finals.

**Student and instructor expectations:**

What you can do to support your success in the course:	What I will do to support your success in the course:
Read the syllabus and stay current with course information	Be prepared and bring my enthusiasm for teaching to each session
Keep up with lectures and assignments, as each one builds on the previous one.	Respond to emails within one working day, and provide timely feedback on assignments / submissions.
Contribute to the learning environment with <a href="#">fairness, cooperation, and professionalism</a>	Establish a learning environment with fairness, cooperation and professionalism, and will take action if these principles are violated.
Treat your classmates, instructional assistants and myself <a href="#">honestly and ethically</a>	Treat you honestly and ethically, and will address any concerns you might have
Commit to excel with integrity <sup>1</sup> . Have the courage to act in ways that are honest, fair, responsible, respectful & trustworthy.	Uphold integrity standards and create an atmosphere that fosters active learning, creativity, critical thinking, and honest collaboration.
Manage your time, so you can stay on track with the course and complete tasks on time	Only assign work that is vital to the course, and will work to meet the standard credit hour allotment for the course.
Communicate with me if you determine that a deadline cannot be met due to extenuating circumstances	Consider requests for adjustments and will make reasonable exceptions available to all students when approved

1. Please read UC San Diego's [Policy on Integrity of Scholarship](#) and take the [integrity pledge](#)!

## **Diversity and inclusion**

Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me early in the semester so that I may make appropriate changes to my records. If you have any suggestions/feedback on how I can make the course more inclusive please email me [dgupta@ucsd.edu](mailto:dgupta@ucsd.edu).

## **Academic Integrity**

The University of California, San Diego has an established [Academic Code of Conduct](#) which outlines the high priority that the school places on academic integrity. BILD 20 students are expected to adhere to the highest standards of academic integrity and honesty. In summary, all academic work assigned in this class will be completed by those to whom it is assigned, and only authorized aid is permitted for use. This means that the weekly quizzes, midterm, and final exams are to be done individually. You are prohibited from cheating on exams, plagiarizing papers, submitting the same paper for credit in two courses without authorization, buying papers, submitting fraudulent documents, and forging signatures. However, you are allowed to collaborate for the weekly homework assignment, and you are allowed to communicate personal and academic challenges that might affect your performance with me. Academic dishonesty is any means employed to attain course credit in any unauthorized manner. BILD 20 students are academically honest; they work hard for their grades, collaborate with their colleagues, and communicate any personal or academic challenges with the instructor. Academic dishonesty will not be tolerated in this or any class on campus. Any student who is caught participating in academic dishonesty may receive a failing grade or may be suspended. Your future is not worth risking trying to get a better grade by cheating.

## **Accessibility**

The University of California, San Diego is committed to providing an educational environment that is accessible to all students. In accordance with this policy, students in need of accommodations due to a disability should contact the [Office for Students with Disabilities \(OSD\)](#) for verification and determination of reasonable accommodations as soon as possible at the beginning of each quarter. After you do this, please notify me of the accommodations being made.

## **Discrimination and Harassment**

The University of California, in accordance with applicable federal and state laws and university policies, does not discriminate on the basis of race, color, national origin, religion, sex, gender, gender identity, gender expression, pregnancy (including pregnancy, childbirth, and medical conditions related to pregnancy or childbirth),

physical or mental disability, medical condition, genetic information, ancestry, marital status, age, sexual orientation, citizenship, or service in the uniformed services (including membership, application for membership, performance of service, application for service, or obligation for service in the uniformed services). The university also prohibits harassment based on these protected categories, including sexual harassment, as well as sexual assault, domestic violence, dating violence, and stalking. The nondiscrimination policy covers admission, access, and treatment in university programs and activities. If students have questions about student-related nondiscrimination policies or concerns about possible discrimination or harassment, they should contact the [Office for the Prevention of Harassment & Discrimination \(OPHD\)](#) at (858) 534-8298. You may also [report bias](#) here. Campus policies provide for a prompt and effective response to student complaints. This response may include alternative resolution procedures or formal investigation. Students will be informed about complaint resolution options. A student who chooses not to report may still contact [CARE at the Sexual Assault Resource Center](#) for more information, emotional support, individual and group counseling, and/or assistance with obtaining a medical exam. For off-campus support services, a student may contact the Center for Community Solutions. Other confidential resources on campus include [Counseling and Psychological Services](#), [Office of the Ombuds](#), and [Student Health Services](#).

## Resources for Support and Learning

<b>Learning and Academic Support</b>	
<p><a href="#">Ask a Librarian: Library Support</a> <i>Chat or make an appointment with a librarian to focus on your research needs</i></p> <p><a href="#">Course Reserves, Connecting from Off-Campus and Research Support</a> <i>Find supplemental course materials</i></p> <p><a href="#">First Gen Student Success Coaching Program</a> <i>Peer mentor program that provides students with information, resources, and support in meeting their goals</i></p> <p><a href="#">Office of Academic Support &amp; Instructional Services (OASIS)</a> <i>Intellectual and personal development support</i></p>	<p><a href="#">Writing Hub Services in the Teaching + Learning Commons</a> <i>One-on-one online writing tutoring and workshops on key writing topics</i></p> <p><a href="#">Supplemental Instruction</a> <i>Peer-assisted study sessions through the Academic Achievement Hub to improve success in historically challenging courses</i></p> <p><a href="#">Tutoring – Content</a> <i>Drop-in and online tutoring through the Academic Achievement Hub</i></p> <p><a href="#">Tutoring – Learning Strategies</a> <i>Address learning challenges with a metacognitive approach</i></p>
<b>Support for Well-being and Inclusion</b>	
<a href="#">Basic Needs at UCSD</a>	<a href="#">Community and Resource Centers</a>

<p><i>Any student who has difficulty accessing sufficient food to eat every day, or who lacks a safe and stable place to live is encouraged to contact:</i> <a href="mailto:foodpantry@ucsd.edu">foodpantry@ucsd.edu</a>   <a href="mailto:basicneeds@ucsd.edu">basicneeds@ucsd.edu</a>   (858) 246-2632</p> <p><b><u>Counseling and Psychological Services</u></b> <i>Confidential counseling and consultations for psychiatric service and mental health programming</i></p> <p><b><u>Triton Concern Line</u></b> <i>Report students of concern: (858) 246-1111</i></p> <p><b><u>Office for Students with Disabilities (OSD)</u></b> <i>Supports students with disabilities and accessibility across campus</i></p>	<p><b><u>Office of Equity, Diversity, and Inclusion</u></b> <i>As part of the <a href="#">Office of Equity, Diversity, and Inclusion</a> the campus community centers provide programs and resources for students and contribute toward the evolution of a socially just campus (858).822-.3542   <a href="mailto:diversity@ucsd.edu">diversity@ucsd.edu</a></i></p> <p><b><u>Get Involved</u></b> <i>Student organizations, clubs, service opportunities, and many other ways to connect with others on campus</i></p> <p><b><u>Undocumented Student Services</u></b> <i>Programs and services are designed to help students overcome obstacles that arise from their immigration status and support them through personal and academic excellence</i></p>
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## Campus Policies

- [UC San Diego Principles of Community](#)
- [UC San Diego Policy on Integrity of Scholarship](#)
- [Religious Accommodation](#)
- [Nondiscrimination and Harassment](#)
- [UC San Diego Student Conduct Code](#)



**Tentative Course Schedule:**

Week	Date	Topic	To do
1	7/3	Introduction to course Central Dogma Gene Structure	
	7/4	No Discussion section, Independence Day	
	7/5	Mendelian Patterns of Inheritance I Monohybrid and Dihybrid crosses	Pre-class survey due 7/5 Wednesday 11:59 pm
	7/6	Discussion section #1	<b>Quiz #1 Due Saturday</b> 11:59 pm <b>Assignment #1 Due</b> <b>Sunday 11:59 pm</b>
2	7/10	Deviations from Mendel Mitosis and Meiosis	
	7/11	Discussion Section #2	
	7/12	X-linked inheritance Pedigree analysis I	<b>Quiz #2 Due Saturday</b> 11:59 pm
	7/13	Discussion Section #3	<b>Assignment #2 Due</b> <b>Sunday 11:59 pm</b>
3	7/17	Pedigree analysis-II Midterm review	
	7/18	Discussion Section #4	
	7/19	<b>Midterm- 8 am to 9:30 am in class (will cover material until 7/12)</b> Sex determination and dosage compensation	<b>Quiz #3 Due Saturday</b> 11:59 pm
	7/20	Discussion Section #5	<b>Assignment #3 Due</b> <b>Sunday 11:59 pm</b>
4	7/24	Non-disjunction Aneuploidy Reproductive testing	<b>Before class: Required reading-</b> The last children of Down syndrome
	7/25	Discussion Section #6	
	7/26	Sex, Genetics and Athletics Introduction to Epigenetics	<b>Quiz #4 Due Saturday</b> 11:59 pm
	7/27	Discussion Section #7	<b>Assignment #4 Due</b> <b>Sunday 11:59 pm</b>

5	7/31	Epigenetics continued Genetics of cancer Introduction to DNA finger-printing	
	8/1	Discussion Section #8	
	8/2	DNA fingerprinting-continued and application to forensic sciences Race and Genetics	<b>Before class: Required reading-</b> Your DNA test could send a relative to jail
	8/3	Discussion Section #9	<b>Assignment #4 Due Thursday 8/3 11:59 pm</b>
	8/4	<b>Cumulative Final 8 am to 11 am (Location TBD)</b>	