

BIO3070 Genetics Course Syllabus

Fall Semester, 2020

Instructor: Chuanzhu Fan, Ph.D.
5107 Biological Sciences Building
Office phone: (313) 577-6451
Email: cfan@wayne.edu
Website: <http://fanlab.wayne.edu>

CLASS MEETING LOCATION AND FORMAT

Synchronous virtual meeting via Zoom

CLASS MEETING TIME

Monday and Wednesday, 10:00 a.m. to 11:15 a.m.

COURSE DESCRIPTION AND OBJECTIVES

This course provides an introductory overview of major and timely topics in genetics. The objective is to provide students with a broadly-based and fundamental understanding of genetics, and to present selected challenges and issues that currently face the genetics research and communities. This course provides students with an understanding of the principles and concepts of genetics and introduces transmission, nature and action of genetic material in organisms. Specific objectives of this course are:

1. Use the principles of chromosome transmission to predict patterns of inheritance.
2. Evaluate scientific data using the rules of probability.
3. Understand how the structure of DNA enables it to function as genetic material.
4. Explain the relationship between genotype and phenotype.
5. Understand the molecular basis of mutation, and its role in genetic variation.
6. Explain how the genetic code enables protein synthesis to be directed by genetic information.
7. Understand how genomes are replicated, repaired, organized and packaged.
8. Describe the modes of gene regulation in prokaryotes and eukaryotes.
9. Use a computer to search public databases and manage bibliographic information.

COURSE CREDITS

This is a 4 credit course. For Honors students who take the optional Honors Section Laboratory, this is a 5 credit course.

COURSE PREREQUISITES

Students are required to have completed BIO2600 (Cell Biology) or the equivalent with a grade of C minus or above. Students who managed to enroll in this course without satisfying these prerequisites will probably not succeed and for this reason will be required to drop it. Students who have questions about these prerequisites should contact the Biology Department's Undergraduate Advisor, Ms. Kim Hunter (kwalk@wayne.edu) during the first week of class.

TEXT BOOK AND LECTURE SLIDES

“*Concepts of Genetics*”, 12th edition, (2019), by Klug, Cummings, Spencer, Palladino, and Killian published by Pearson Benjamin Cummings, ISBN978-0-134-60471-8, is **REQUIRED**. “*Student’s Handbook and Solutions Manual for Concepts of Genetics*” (2019) by Nickla, Gaudette, Klug, Cummings, Spencer, Palladino, and Killian published by Pearson Benjamin Cummings, ISBN978-0-134-87008-3, is highly **RECOMMENDED**. Additional material may also be added. Every effort will be made to provide the lecture slides on Canvas a day or more before class. However, NOT ALL the slides from each lecture will be provided on Canvas. Some slides will **only be shown** in class. Students are responsible for knowing **ALL** the material that is presented in class, even if that material is not provided on Canvas and textbook.

OFFICE HOURS

Dr. Fan’s office hours are Thursday 1:00p.m.- 3:00p.m via Zoom meeting. Dr. Fan will be happy to help students learn the material they are having trouble understanding. A mutually convenient appointment at other times for Zoom meeting may also be arranged by emailing Dr. Fan. However, **office hours are NOT a substitute for lectures**. In addition, students are welcome to e-mail Dr. Fan for questions or comments. Emails are generally answered within 24 hours. Nevertheless, students are encouraged to first contact their Teaching Assistant (TA) with their questions prior to contacting Dr. Fan.

EXAMS

There will be **Four** written midterm examinations. There will also be one final exam that will be comprehensive, i.e. it will cover material presented in the entire course. There will be no make-up exams except as noted below.

While facts are important, the emphasis of exams will be on problem solving and understanding genetic concepts. The tests will be designed to assess students’ grasp of fundamental principles and their applications. All exams, except for the cumulative final, will have all sections that require written problem-solving answers. This may differ from other courses you have taken. Students are strongly advised to prepare themselves for the exams by working **ALL** of the problems within and at the back of each chapter because many of the test questions may be similar. Students should understand that working out the problems within and at the end of each chapter is one of the best ways to learn the material and to prepare for examinations. Students are strongly encouraged to virtually or in-person work and study together in groups (get a “Study Buddy”! **But you must follow Governor’s EO if group gathering**). Experience has shown that the process of explaining material to other people clarifies the concepts in one’s own mind. Students are also strongly encouraged to make **ALL** discussion sections with their TAs.

EXAM FORMATS

The four midterms and the final exam will be held synchronous virtually. For all exams calculators will be allowed. Cell phones and all other electronic communication devices (except device used for exam) must be turned off.

The four midterm exams will all be written exams and contain **100%** problem solving problems. These problems may be conceptually similar to those presented in class and those found within and at the end of the chapters in the textbook (including the *Extra Spicy problems*). The final exam will be multiple-choice (five choices) but most of questions (>95%) will also be problem-solving based.

EXAM DATES

There will be four written midterm examinations given in synchronous Zoom meeting class:

Monday, September 28, 2020

Wednesday, October 21, 2020

Monday, November 16, 2020

Monday, December 14, 2020

The FINAL EXAM will be held on Monday, December 21, 2020 from 8:00 a.m. to 10:00 a.m. The final exam is scheduled as designated in the Schedule of Classes for this term (https://wayne.edu/registrar/scheduling/final_exam_schedule_fall_2020.pdf). No other time for the final exam will be available and no exceptions will be made for conflicts such as student travel plans.

POLLING

Zoom polling will be used in this course, and polling points will contribute to your grades. Polling question will generally be of two kinds:

- Questions at the beginning of class or anytime of the class on the homework assignment or on the concepts and topics of the current or previous lectures.

You win polling points as follows:

Points	Assessment
0	No answer
0.5	Wrong answer
2	Right answer

A total of forty (40) polling questions will be given throughout entire semester starting the second week (the week of September 9th, 2020). In general, two (2) polling questions per lecture will be given. Polling questions will be all multiple-choice question with five choices, and only one correct answer will be. All polling points may be credited to your final grades even if you earn over 80 polling points (accounted for 100%).

DISCUSSION/QUIZ SECTIONS

Attendance at the discussion/quiz sections is mandatory. Discussion/quiz section will start from week 1 (the week of September 1st, 2020). Students may not attend a section for which they are not registered. Students may be assigned homework problems that are recommended to help them learn the material and to prepare for the exams. In addition, the TA will give 14 quizzes (one quiz/week) during the semester and two quizzes with lowest score may be dropped. **NO MAKE-UP QUIZZES will be allowed under any circumstances.** However, students will be allowed to drop their two lowest quiz scores.

HONORS LABORATORY

The Honors Laboratory will start from week 1 (the week of September 1st, 2020). The Honors Laboratory will be graded on an accumulation of points from quizzes (40 points), one homework assignment (10 points), proper participation in the laboratory (20 points), and laboratory notebooks (30 points). If students miss a quiz for any reason, there will not be an opportunity to make it up. Laboratory participation that includes laboratory behavior and attendance will be counted up to twenty (20) points. Four (4) points will be taken off for each

laboratory absence without legitimate excuse (e.g. illness with physician's note, approved to attend undergraduate research conference). Additionally, if students are not diligently working or completing the laboratory assignments, the TA may take points off from their participation grade. This is totally at the discretion of the TA. In addition, students' laboratory notebooks will be collected at **THREE (3)** unannounced times. Students may earn up to 10 points per notebook review. Starting the second week of the semester, **FIVE (5)** unannounced laboratory quizzes will be given, and one quiz with lowest scored may be dropped. **NO MAKE-UP QUIZZES will be allowed under any circumstances.**

Students must have a laboratory notebook with them for each laboratory. The notebook must be bound (e.g., a composition book). In the notebook, students must prepare complete notes of protocols or other information necessary to do the day's experiment before they enter the Zoom laboratory. Students are to enter the data from their observations into the laboratory notebook.

If you enroll in the honors section of this course, you will not be allowed to transfer to the non-honors section after two weeks following the start of the semester. If you are unable to complete the work for the honors section during the semester, you will be given the grade of Incomplete in the class. You will have one year to finish the work and change your grade from incomplete to a letter grade. Failure to complete the honors section work in the one year period will result in a change from an incomplete to an F for the course.

GRADING

There will be four midterms and each midterm exam will be worth 120 points. No midterm will be dropped and all exams will be 100% counted.

Total points of midterms = (sum of all four exams)

The final exam is worth 220 points and will be comprehensive, i.e. it will cover material presented in the entire course. The final exam is mandatory and will be counted as 100%.

Exams (midterms and final) will generally not be curved. Curve of exams may be considered given a certain circumstance. If curved, the grades on exam may be standardized against the second highest grade in the class. For example, all scores may be adjusted by adding the number of points necessary for the second highest score to equal 120 points (midterms) or 220 points (final exam). The highest score that can be achieved is 120 for midterm and 220 for final exam. However, Dr. Fan has full discretion in deciding the appropriate curve. Overall course scores will not be curved.

The total point distribution is as follows:

	Regular Discussion section	Honors Lab section
Midterm Exams	480	480
Final Exam	220	220
Discussion section/Honors Lab	120	220 (120+100)
Polling	80	80
Total	900	1,000

There is no extra credit for exams and quizzes under any circumstances. Scores will not be "rounded up" when assigning grades.

The final letter grade will be determined by a straight score as follows:

Total Points		% of available marks	Final Grade
Regular section	Honor section		
819-900	910-1000	91-100	A
792-818	880-909	88-<91	A-
756-791	840-879	84-<88	B+
720-755	800-839	80-<84	B
684-719	760-799	76-<80	B-
648-683	720-759	72-<76	C+
621-647	690-719	69-<72	C
594-620	660-689	66-<69	C-
558-593	620-659	62-<66	D+
522-557	580-619	58-<62	D
495-521	550-579	55-<58	D-
<494	<549	<55	F

Scores will not be “rounded up” when assigning the letter grades.

Students with course scheduling conflicts for any midterm exam must notify Dr. Fan in writing and provide documents by class time on Tuesday, September 15th, 2020. No make-up exams will be given unless he/she is notified in writing by class time on this date. Reasonable exceptions will be granted in cases of illness which will require notification at least 24 hours prior to the exam and must be followed up with an original signed note from a physician within three days. No make-up exams will be provided due to court cases or other non-academic scheduling issues, except for religious holidays as described below. The grant of makeup exam(s) is absolutely at the discretion of Dr. Fan.

EXAM GRADE DISPUTES / CHALLENGE OPTION

Students may have **one (1) week** after the exam to challenge the score for any question. Failure to challenge the score within this period indicates a willingness to accept the score as is. The challenge may consist of a typed (not hand-written) description of why the answer is correct, or directly talk with Dr. Fan during Zoom office hour.

CHEATING

... or changing an answer on an exam to obtain more points on a re-grade, will receive a zero for that test with no opportunity to drop or replace that score
* * * * *

A strict zero-tolerance policy for cheating will be enforced. Anyone caught cheating on an exam, quiz, or any other assigned work in any aspect of this course will receive a score of 0 (zero) for that portion of the grade.

Students are found to be cheating during an exam or quiz (using a “cheat sheet”, looking at another’s paper, allowing another student to look at your paper, or using any electronic device to communicate with another person), will receive a zero for that test with no opportunity to drop or replace that score. A second episode of cheating will result in a grade of F for the course and may also result in initiation of university disciplinary action.

POSTING OF EXAM GRADES

Exam grades will be posted on Canvas by Student ID Number as soon as possible after the exam has been administered. The distribution of scores may be provided in class.

SPECIAL CONSIDERATIONS FOR INDIVIDUALS WITH DISABILITIES

If you have a documented disability that requires accommodations, you will need to register with Student Disability Services for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. The SDS telephone number is 313-577-1851 or 313-202-4216 for videophone use. Once you have met with your disability specialist, I will be glad to meet with you privately during my office hours to discuss your accommodations. Student Disability Services' mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University. You can learn more about the disability office at www.studentdisability.wayne.edu.

Please be aware that a delay in getting SDS accommodation letters for the current semester may hinder the availability or facilitation of those accommodations in a timely manner. Therefore, it is in your best interest to get your accommodation letters as early in the semester as possible.

RELIGIOUS HOLIDAY CONFLICTS

Students who have a conflict with any of the scheduled class or exam times due to religious reasons must notify Dr. Fan in writing by class time on or before Tuesday, September 15th, 2020. No make-up exams will be given unless he is notified in writing by this date.

ADD/DROP POLICY

Add requests will not be approved after the second week of class, i.e. Tuesday, September 15th, 2020. Drop requests must be approved before the fifth week of class (<http://reg.wayne.edu/students/information.php#dropping>). Beginning the fifth week of class students are no longer allowed to drop but must withdraw from classes. Students who sign up for a class, stop attending, and fail to withdraw will receive an F for the course. Students who withdraw from the course after the fifth week will be assigned one of the following three grades: WP (withdrew but was passing at the time), WF (withdrew but was failing at the time), WN (withdrew and never attended class or no graded work). An "I" grade earned by a student will automatically revert to "F" if the work is not completed within one calendar year. There are no exceptions. Further information on the grading policy can be found at <http://sdcl.wayne.edu/RegistrarWeb/Registrar/policies.html>.

SCHEUDLE OF TOPICS COVERED

Some topics may require more or less time to cover than indicated on this schedule, so the actual topics covered on given days are subject to change depending on the rate of progress. Dates of exams and holidays are NOT flexible.

Date	Day of the week	Book Chapter	Topic
09/02/20	Wednesday	1	Introduction to genetics
09/09/20	Wednesday	2	Mitosis and meiosis
	Monday	3	Mendelian genetics

09/14/20				
01/16/20	Wednesday	3	Mendelian genetics	
09/21/20	Monday	4	Extensions of Mendelian genetics	
09/23/20	Wednesday	4	Extensions of Mendelian genetics	
09/28/20	Monday	Midterm exam #1		
09/30/20	Wednesday	5	Chromosome mapping in eukaryotes	
10/05/20	Monday	5	Chromosome mapping in eukaryotes	
10/07/20	Wednesday	6	Genetic analysis and mapping in bacteria and bacteriophages	
10/12/20	Monday	7	Sex determination and sex chromosomes	
10/14/20	Wednesday	8	Chromosome mutations: variation in number and arrangement	
10/19/20	Monday	8	Chromosome mutations: variation in number and arrangement	
10/21/20	Wednesday	Midterm exam #2		
10/26/20	Monday	10	DNA structure and analysis	
10/28/20	Wednesday	20	Recombinant DNA technology	
11/02/20	Monday	ST2	DNA Forensics	
11/04/20	Wednesday	11	DNA replication and recombination	
11/09/20	Monday	12	DNA organization in chromosomes	
11/11/20	Wednesday	13	The genetic code and transcription	
11/16/20	Monday	Midterm exam #3		
11/18/20	Wednesday	14	Translation and proteins	
11/23/20	Monday	15	Gene mutation, DNA repair, and transposition	
11/25/20	Wednesday	Thanksgiving	No class	
11/30/20	Monday	16	Regulation of gene expression in bacteria	
12/02/20	Wednesday	17	Transcriptional regulation in eukaryotes	
12/07/20	Monday	18	Posttranscriptional regulation of gene expression in eukaryotes	
12/09/20	Wednesday	ST1	CRISPR-Cas and genome editing	

12/14/20 Monday Midterm exam #4

**12/21/20 Monday
8am-10am Final Exam.**

UNEXPECTED UNIVERSITY CLOSURES.

If the University is officially closed on an exam day, the exam will be held on the next regularly scheduled class day. Closure of the University is announced by the following mechanisms:

1. WSU Homepage (www.wayne.edu) *
2. The University Newsline (313) 577-5345 *
3. WSU Academica (www.a.wayne.edu) *
4. WDET-FM (Public Radio 101.9)
5. By other local radio and television stations

* Note: The information on closures and class cancellations is likely to be found at these locations before it is broadcast by local radio and television stations

OTHER

Please turn off cell phones and all other electronic communication devices during class, during laboratory/discussion sections, and during exams.

Any specific issue not covered by this syllabus will be resolved using University policies.

Disputes that cannot be resolved following the guidelines present in this syllabus will be resolved by following the guidelines of the University “Student Due Process”.