

# **BIO3070 Genetics Course Syllabus Fall Semester, 2018**

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**

0146 DeRoy

## **CLASS MEETING TIME**

Monday, Wednesday and Friday, 11:30 a.m. to 12:20 p.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 BIO2200 (Microbiology) and 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 see 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*”, 12<sup>th</sup> 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 Tuesday and Thursday 2:00 p.m.- 4:00 p.m. Office hours will be held only on those days when Wayne State University is open.

A mutually convenient appointment at other times may also be arranged by emailing Dr. Fan. Dropping in unannounced may work on occasion but will not be successful and students may be asked to wait and/or to come back at some appointed time. Dr. Fan will be happy to help students learn the material they are having trouble understanding. 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 **Five** in-class 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 will 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 work and study together in groups (get a “Study Buddy”!). 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 five midterms and the final exam will be closed book and held in class. The only thing that students will need to bring to the exams is a few sharp pencils or pens. For all exams calculators will be allowed. Cell phones and all other electronic communication devices must be turned off. Cell phones may **not** be used as calculators during exams. Anyone who leaves the exam room prior to the end of the test will **not** be allowed back in. This includes bathroom

breaks; students are advised to plan accordingly. Late-arriving students should know that admittance into the exam room will not be allowed after the first student has left the room.

The five midterm exams will all be written exams and contain **100%** problem solving problems. These problems will be conceptually similar to those presented in class and very much like 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. Scantron forms will be supplied. Students should not bring their own Scantron forms to the final exam as they will not be allowed to use them.

The time allowed for each exam includes the time needed to put your name on the pages. For all five midterms, every page will have a place at the top for your name. If your name is not on a page, then that page will not be graded. Each page must have your name on it because the exams are disassembled for grading, then reassembled prior to being returned to students. Pages without names cannot be returned because the graders will not know whose exam is whose.

When the exam time is over, an announcement of “pencils down” will be made. This means there is no more time to write; students will be expected to remain seated and to pass their exam to the end of their row. No talking will be allowed until all the exams have been collected.

Exams will be scanned and archived right after they are graded and before they are returned to students.

## EXAM DATES

There will be five closed-book midterm examinations given in class:

***Friday, September 14, 2018***

***Friday, October 05, 2018***

***Friday, October 26, 2018***

***Friday, November 16, 2018***

***Friday, December 07, 2018***

The **final exam** will be held on **Monday, December 17, 2018 from 10:15 a.m. to 12:15 p.m.**, the same classroom as the class is held (DRY 0146). The final exam is scheduled as designated in the Schedule of Classes for this term ([https://reg.wayne.edu/finals/final\\_exam\\_schedule\\_fall\\_2018\\_v2.pdf](https://reg.wayne.edu/finals/final_exam_schedule_fall_2018_v2.pdf)). No other time for the final exam will be available and no exceptions will be made for conflicts such as student travel plans.

## i>CLICKERS

i>Clickers will be used in this course, and clicker points will contribute to your grades. You must purchase a clicker at the WSU bookstore or other vendors, and then register your clicker at Canvas so that answers from your clicker can be credited to you. Clicker 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 Clicker points as follows:**

Points	Assessment
<b>0</b>	<b>No answer</b>
<b>0.5</b>	<b>Wrong answer</b>
<b>2</b>	<b>Right answer</b>

A total of forty (40) clicker questions will be given throughout entire semester starting the second week (the week of September 3<sup>rd</sup>, 2018). In general, one (1) clicker question per

lecture will be given. Clicker questions will be all multiple-choice question with five choices, and only one correct answer will be. All clicker points may be credited to your final grades even if you earn over 70 clicker points (accounted for 100%).

It is strictly forbidden to operate someone else's clicker for them. If you are discovered doing this, then both you and the person whose clicker you operated will receive **ZERO** for entire clicker points (***THIS IS ZERO-TOLERANCE POLICY***). If you see a classmate operating two or more clickers, please bring it immediately to my attention. You are required to use **same clicker** throughout the entire semester. Registering a different clicker may wipe out all points that you earn previously. Therefore, it is your own responsibility if you lose your clicker points due to a different clicker used.

## **DISCUSSION/QUIZ SECTIONS**

Attendance at the quiz sections is mandatory. Quiz section will start from week 1 (the week of August 29<sup>th</sup>, 2018). 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 13 quizzes (generally, 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.

One homework will be assigned at the third week of the semester (the week of September 10<sup>th</sup>, 2018) and due on Monday November 19<sup>th</sup>, 2018. Up to 20 points of this home assignment will be awarded to your discussion section points. This homework is **mandatory** and cannot be dropped

Behavior that is not conducive to learning or is distracting to other students, such as (but not limited to) excessive talking at inappropriate times, chronic unexcused tardiness, leaving early, disruptive behavior, cell phone conversations, etc., may result in the deduction of points at the discretion of the TA.

## **HONORS LABORATORY**

The Honors Laboratory will start from week 1 (the week of August 29<sup>th</sup>, 2018). The Honors Laboratory will be graded on an accumulation of points from quizzes (40 points), proper participation in the laboratory (20 points), and laboratory notebooks (40 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 **FOUR (4)** 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 laboratory. Students are to enter the data from their observations into the laboratory notebook.

Students may not make up laboratories that were missed. Missing any laboratory will cause the loss of points and may affect the final course grade. Students may not miss more than five laboratories in total to complete this course. If a student misses **FIVE or more** laboratories, for whatever reason, they must either withdraw from the course or they will receive a grade of “F” in the course.

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

**Total points of midterms = (sum of all five exams)**

The final exam is worth 200 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%.

The grades on each exam will generally 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 100 points (midterms) or 200 points (final exam). The highest score that can be achieved is 100 for midterm and 200 for final exam. However, Dr. Fan has full discretion in deciding the appropriate curve.

The total point distribution is as follows:		
	Regular Discussion section	Honors Lab section
Midterm Exams	500	500
Final Exam	200	200
Discussion section/Honors Lab	130	230 (130+100)
iClicker	70	70
<b>Total</b>	<b>900</b>	<b>1,000</b>

*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

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**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 by class time on Wednesday, September 12<sup>th</sup>, 2018. 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.

### **EXAM GRADE DISPUTES / CHALLENGE OPTION**

Students may have **one (1) week** after the return of an 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 office hour and an appointment. It is not an opportunity to complain. The challenge must be turned in to Dr. Fan and accompanied by the exam.

### **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**  
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A strict zero-tolerance policy for cheating will be enforced. Anyone caught cheating on an exam, quiz, laboratory assignment 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 will also 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](http://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 Wednesday, September 12<sup>th</sup>, 2018. 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. Wednesday, September 12<sup>th</sup>, 2018. 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://sdel.wayne.edu/RegistrarWeb/Registrar/policies.html>.

### SCHEDULE 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
08/29/18	Wednesday	1	Introduction to genetics
08/31/18	Friday	2	Mitosis and meiosis
09/05/18	Wednesday	2	Mitosis and meiosis
09/07/18	Friday	3	Mendelian genetics
09/10/18	Monday	3	Mendelian genetics
09/12/18	Wednesday	3	Mendelian genetics
<b>09/14/18</b>	<b>Friday</b>	<b>Midterm #1</b>	

09/17/18	Monday	4	Extensions of Mendelian genetics
09/19/18	Wednesday	4	Extensions of Mendelian genetics
09/21/18	Friday	4	Extensions of Mendelian genetics
09/24/18	Monday	5	Chromosome mapping in eukaryotes
09/26/18	Wednesday	5	Chromosome mapping in eukaryotes
09/28/18	Friday	5	Chromosome mapping in eukaryotes
10/01/18	Monday	6	Genetic analysis and mapping in bacteria and bacteriophages
10/03/18	Wednesday	6	Genetic analysis and mapping in bacteria and bacteriophages
<b>10/05/18</b>	<b>Friday</b>	<b>Midterm #2</b>	
10/08/18	Monday	7	Sex determination and sex chromosomes
10/10/18	Wednesday	8	Chromosome mutations: variation in number and arrangement
10/12/18	Friday	8	Chromosome mutations: variation in number and arrangement
10/15/18	Monday	8	Chromosome mutations: variation in number and arrangement
10/17/18	Wednesday	10	DNA structure and analysis
10/19/18	Friday	10	DNA structure and analysis
10/22/18	Monday	20	Recombinant DNA technology
10/24/18	Wednesday	ST2	DNA Forensics
<b>10/26/18</b>	<b>Friday</b>	<b>Midterm #3</b>	
10/29/18	Monday	11	DNA replication and recombination
10/31/18	Wednesday	11	DNA replication and recombination
11/02/18	Friday	12	DNA organization in chromosomes
11/05/18	Monday	13	The genetic code and transcription
11/07/18	Wednesday	13	The genetic code and transcription
11/09/18	Friday	13	The genetic code and transcription
11/12/18	Monday	14	Translation and proteins
11/14/18	Wednesday	14	Translation and proteins
<b>11/16/18</b>	<b>Friday</b>	<b>Midterm #4</b>	
11/19/18	Monday	15	Gene mutation, DNA repair, and transposition
<b>11/19/18</b>	<b>Monday</b>	<b>GenBank homework due</b>	
11/26/18	Monday	15	Gene mutation, DNA repair, and transposition



11/28/18	Wednesday	16	Regulation of gene expression in bacteria
11/30/18	Friday	16	Regulation of gene expression in bacteria
12/03/18	Monday	17	Transcriptional regulation in eukaryotes
12/05/18	Wednesday	18	Posttranscriptional regulation of gene expression in eukaryotes
<b>12/07/18</b>	<b>Friday</b>	<b>Midterm #5</b>	
12/10/18	Monday	ST1	CRISPR-Cas and genome editing
<b>12/17/18</b>	<b><u>Monday</u></b>	<b>Final Exam (10:15 a.m. to 12:15 p.m.), in the same room as class is held (DeRoy 0146).</b>	

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### **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](http://www.wayne.edu)) \*
2. The University Newslines (313) 577-5345 \*
3. WSU Academica ([www.a.wayne.edu](http://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".