

Instructor: Dr. V. Meller - 1370 Bio. Sci. Bldg  
 Class Hours: T, Th 5:30-6:45 by Zoom  
 Discussion Section as Selected  
 Online Office Hours: Wednesday 12:30-1:30 or by appointment  
 Review Sessions as Announced  
 Text: Klug, Cummings, Spencer and Palladino.  
 Concepts of Genetics, 12<sup>th</sup> Edition  
 Additional readings will be posted on Canvas  
 e-mail: [Victoria.Meller@wayne.edu](mailto:Victoria.Meller@wayne.edu)

Questions about the material should be posted on the Canvas Discussion Board. If you wish anonymity, e-mail the question to Dr. Meller and the answer will be posted without identifying the sender.

### Course description and objectives

This course deals with the transmission and expression of genetic information. Upon successful completion of the course a student will be able to:

- Apply principles of chromosome transmission to predict patterns of inheritance*
- Evaluate scientific data using the rules of probability*
- Understand how the structure of DNA enables it to function as genetic material*
- Explain the relationship between genotype and phenotype*
- Understand the molecular basis of mutation, and its role in genetic variation*
- Explain how the genetic code enables protein synthesis directed by genetic information*
- Describe how genomes are replicated, repaired, organized and packaged*
- Compare the modes of gene regulation in prokaryotes and eukaryotes*
- Read, understand and summarize a scientific publication*
- Extract genetic information from public databases*

### Course Prerequisites

Biology majors are required to have completed Bio 2600 (Cell Biology) *with a C- or better.*

Neuroscience majors are required to have completed Bio 2550 (Cell Bio for Neuro) *with a C- or better.*

### Tentative Lecture Schedule

	Date	Topic	Chapter
1	Jan 12 T	Introduction Mitosis	1 (all) 2.1-2.3
2	14 Th	Meiosis Mendelian Genetics	2.4-2.7 3.1-3.3
3	19 T	Mendelian ratios, imperfect data, probability and pedigrees	3.4-3.10
4	21 Th	The nature of alleles <b><i>Opinion paper due 5:30 PM – Did Mendel Cheat?</i></b>	4.1-4.10

<b>January 26</b>		<b>EXAM 1 Includes material 1/12 - 1/21</b>	
5	28 Th	Complementation X-linkage, linkage groups and recombination	4.11 5.1-5.2
6	Feb 2 T	Mapping	5.3-5.5, 5.7-5.9
7	4 Th	The genetics of bacteria and viruses, recombination in viruses	6 (all)
8	9 T	Sex determination and dosage compensation Variations in ploidy	7.1-.2, 7.4-.6 8.1
9	11 Th	Duplication, deletion, translocation and inversion	8.2-8.8
<b>February 16</b>		<b>EXAM 2 Includes material 1/28 – 2/11</b>	
10	18 Th	Extranuclear inheritance DNA as the genetic material	9 (all) 10.1-10.5
11	23 T	DNA structure Geometry of DNA replication, topology of replication	10.6-10.7 11.1, 12.2
12	25 Th	Enzymology of replication in prokaryotes and eukaryotes <b>Problem set due 5:30 AM. Watson, Crick, Pauling and Cory</b>	11.2-11.7
13	Mar 2 T	Recombination, composition of genomes and chromosomes	11.8, 12.1, 12.3
14	4 Th	Hybridization, <i>C<sub>ot</sub></i> analysis, genome size and complexity Chromatin structure	10.10 12.4-12.7
15	9 T	Biotechnology: restriction, sequencing, PCR, CRISPR-Cas9	20 (all)
<b>March 11</b>		<b>EXAM 3 Includes material 2/18 – 3/9</b>	
<b>March 15-19</b>		<b>Spring Break</b>	
16	23 T	The genetic code, transcription, mRNA processing	13.1-13.11
17	25 Th	Translation Proteins	14 (all)
18	30 T	Mutation and Repair <b>Problem set due 5:30 PM. Public databases.</b>	15.1-15.7
19	Apr 1 Th	Control of gene expression in prokaryotes	16 (all)
20	6 T	Control of gene expression in eukaryotes Epigenetics, regulation of eye development	17 (all) 19.1, 19.3, 23.8

21	8 Th	Posttranscriptional regulation, RNA interference	18 (all)
22	13 T	The genetics of development <b><i>Paper due 5:30 PM. Eyeless and Gal4.</i></b>	23.1-23.5
23	15 Th	Genomics, genome-wide association studies (GWAS)	21.1-21.5 22.7
24	20 T	Cell cycle and cancer, The maleable genome <b><i>Paper due 5:30 PM. The genetic basis of cancer.</i></b>	2.3, 24.1-.6 15.8
<b>22 Th</b>		<b>EXAM 4 Includes material 3/23 through 4/20</b>	
<b>Apr. 29 Th</b>		<b>Final Comprehensive Exam, 5:30-7:30</b>	

**DATES THAT YOU SHOULD BE AWARE OF**

<b>Jan. 25</b>	Last day to add
<b>Jan. 25</b>	Last day to <u>drop and receive tuition refund</u>
<b>Jan. 25</b>	Last day to <u>drop with no record of enrollment</u> . Students dropping after Jan. 17 will receive WP or WF on their transcripts.
<b>March 28</b>	Last day to withdraw
<b>April 29</b>	<b>Final exam, 5:30-7:30</b>

**Registration for discussion sections:** You may only attend the discussion section for which you are registered. If you wish to change sections, you must add/drop in Academia.

**Lecture:** Lectures will be on Zoom and will be recorded. Please mute your microphone except when participating in a discussion. The assigned reading is designed to prepare you for the lecture. If you hope to do well in Genetics you should complete assigned reading and attend online lectures. The schedule of topics to be covered is tentative. It is possible that not all topics on the syllabus will be covered. Exams will be held on the days indicated in the syllabus. *If lectures have fallen behind the syllabus, you will be tested on topics up to and including the final lecture before the exam.*

**N.B.** Some material or emphases will be given in lecture that are not in your book. You will be responsible for this material. I will be happy to help students during office hours. However, office hours are not a substitute for lectures.

**Tests:** There will be 4 closed-book preliminary examinations during regular class periods and a comprehensive final exam. You are responsible for ensuring that you have access to adequate internet connectivity during exams. If your internet is unreliable you can reserve a seat in a library on campus (<https://library.wayne.edu/services/reservations-and-pickup/>). Each preliminary exam will include material covered since the last exam but the final exam is comprehensive. No calculators will be necessary during exams, but you will need paper, a

pencil and proficiency in fractional math. Exams will be multiple choice, problem solving and essay. The format may vary from exam to exam. Scores for each exam will be adjusted by adding the number of points necessary for the second highest class score to equal 100%. For example, if the second highest score on a midterm is 96, all scores will be adjusted by adding 4 points to the raw score. No additional curving of final grades will be done. No extra credit will be given under any circumstances. Grades will be posted in the Canvas grade book as soon as possible. All exams, including the final, are worth 100 points.

While facts are important, emphasis will be placed on understanding and applying genetic concepts. All exams will require problem solving and there will be some written answers. This may differ from what you are used to. You should prepare yourself by working assigned problems and attending discussion sections.

Exams will not be rescheduled for individual students who request a change in time due to personal or professional conflicts, the single exception being a university-recognized religious conflict. Anyone requiring rescheduling for a university-recognized religious holiday must inform Dr. Meller by email at least 48 h prior to the exam.

A single low or missed exam score will be dropped. If you take all exams, the lowest score will be dropped. If you miss one exam and do poorly on another, only the missed exam will be dropped. This will be done automatically during calculation of the final grade.

**Regrading:** Errors occur in grading exams and reporting scores. If you believe a grading, calculating or reporting error has affected your grade, send a written explanation to me within one week of when the exam was returned to you or the grade posted.

**Final grade calculation:** The four highest exam scores (400 points possible) will be added to the discussion (up to 100 points) or laboratory (up to 200 points) grade. No curve will be applied to final grades. Grades will be assigned based on the percent of points earned using the scale below.

**The total point distribution is as follows:**

	<u>Lecture and discussion</u>	<u>Honors section</u>
Four Lecture Exams (4 X 100)	400	400
Discussion/Honors Lab	100	200
Total Points Possible	500	600

**Letter grades will be determined from a straight scale as follows:**

Total Points	Grade	Total Points	Grade	Total Points	Grade
90%-100%	A	76%- <78%	B-	64%- <66%	D+
87%- <90%	A-	74%- <76%	C+	58%- <64%	D
85%- <87%	B+	68%- <74%	C	56%- <58%	D-
78%- <85%	B	66%- <68%	C-	<56%	F

**Withdrawal Policy** You may drop without permission or record of enrollment until January 25.

After January 25 withdrawals will receive WF or WP (failing, passing). WP will be given for those with averaged exam grades of 56% or higher. Missed exams in excess of 1 will be included as zero in the grade. For example, if you received 80 on one exam but skipped two other exams, your average exam grade will be 40%. WF will be given for averages below 56%. The

discussion section grade will not be included. The deadline to withdraw is March 28. After March 28, letter grades will be issued.

**Discussion/Quiz Sections: Attendance at discussion sections is mandatory.** Working problems and taking quizzes will help you understand key concepts and prepare for the exams. Exams will draw heavily on situations and concepts from the homework. Working these problems, and discussing them with your TA, will improve exam performance.

Unannounced quizzes will be given in discussion section. If you miss a quiz for any reason, you may take a make-up quiz towards the end of the semester at a time scheduled by your TA. You may not make up more than one missed quiz. You may not replace a poor quiz score with the make up. Behavior that is not conducive to learning or is distracting to other students, may result in the deduction of points at the discretion of the TA. The discussion section will contribute up to 100 points to your final grade. Discussion grades will be calculated as a percent of credit available. For example, if a total of 265 points of quizzes and assignments was available and a student earned 205 points, the discussion section grade will be 77.36. If grading disparities between discussion sections occur, the grades of an entire section may be adjusted up or down. Group study is encouraged because explaining the material to others clarifies concepts. However, written assignments are to be individual efforts. Copying from a publication, the internet or another student and submitting it as your own work is cheating and will result in a zero for the assignment.

**Honors Laboratory:** The laboratory will be online only during winter 2021. The laboratory grade contributes up to 200 points, based on quizzes, proper participation in the lab, notebooks and the lab final. If you miss a quiz for any reason, there will not be an opportunity to make it up. If you are not diligently working or completing the lab, the TA may take points off your grade. This is totally at the discretion of the TA. Lab notebooks will be collected at five unannounced times. You can earn up to 10 points per notebook review. There will be a laboratory exam during the last week of the semester.

You must prepare complete notes of protocols or other information necessary to do the day's experiment **before beginning the laboratory**. You are to record data from observations into your lab notebook. Missed labs can not be made up and will hurt your grade. You may not miss more than three labs in total. If four or more labs are missed, for any reason, you must withdraw or receive an F.

**Cheating: We will enforce the student code of conduct.** Punishment will depend on the severity of the infraction and may range from receiving 0 on the assignment to expulsion from the university. A student that is found to have engaged in more than one episode of cheating will automatically receive an F for the course, irrespective of the severity of the offense. Students who plagiarize assignments will receive a 0 for that assignment. A second incident of plagiarism, or any other form of cheating, will result in an F for the course. A written report will be sent to the Office of the Dean of Students when a grade is lowered for cheating. Any incident of cheating on an exam will result in 0 for the exam. This grade can not be dropped as the low exam and will be factored into the final grade.

**Students with disabilities:** If you have a disability that requires accommodations, you will need to register with Student Disability Services for coordination of your academic accommodations. The Student Disability Services (SDS; <https://studentdisability.wayne.edu>) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department, telephone number 313-577-1851 or 313-577-3365 (TTY: telecommunication device for the deaf; phone for hearing impaired students only). Once you

have accommodations in place, I will be glad to meet with you privately to discuss your needs. Please be aware that a delay in getting SDS accommodation letters for the current semester may hinder the availability or facilitation of accommodations in a timely manner. Therefore, it is in your best interest to get your accommodation letters as early in the semester as possible. 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.

**Unexpected University closures:** If the University is officially closed on an exam day, the exam will be held during the next regularly scheduled class. If the university is closed on April 22, no rescheduling of the last preliminary exam will be possible. Grades will be calculated on the basis of the preliminary exams already taken and the final. Closure of the University is announced by the following mechanisms:

1. University Newline (313) 577-5345 \*
2. WSU Homepage ([www.wayne.edu](http://www.wayne.edu)) \*
3. WDET-FM (Public Radio 101.9)
4. 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

Any specific issue not covered by this syllabus will be resolved using University policies. The grade appeal process is outlined at: <https://clas.wayne.edu/students/policies/grade-appeal>

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".