

Instructor: Dr. V. Meller, rm 2123 Bio. Sci. Bldg
 Class Hours: M, W, F 11:30-12:20, 146 Deroy
 Discussion Section as Selected
 Office Hours: Tuesdays 10:30-11:30, or by appointment
 Review sessions as announced
 Text: Klug, Cummings, Spencer and Palladino.
 Concepts of Genetics, 11th Edition.
 Additional readings will be posted on BlackBoard
 e-mail: vmeller@biology.biosci.wayne.edu

Use the Blackboard discussion site (<http://blackboard.wayne.edu/>) to ask questions about the material. If you wish anonymity, e-mail the question to me and I will post the question and answer without identifying you.

Course description and objectives

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

Use the principles of chromosome transmission to predict patterns of inheritance

Use the rules of probability to evaluate scientific data

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

Students are required to have completed Bio 2200 (Microbiology) and Bio 2600 (Cell Biology) *with a C- or better in both.*

Tentative Lecture Schedule

| | Date | Topic | Chapter |
|---|------------------|---|---------------|
| 1 | Aug 30, W | Introduction: from gene to chromosome to organism | 1 (all) |
| 2 | Sept 1, F | Mitosis and meiosis | 2 (all) |
| | Sept 4, M | Holiday | |
| 3 | 6, W | Mendelian genetics | 3.1-.2 |
| 4 | 8, F | Mendelian ratios, imperfect data and probability | 3.3-.8 |
| 5 | 11, M | The pedigree and the nature of alleles <i>Opinion paper due 11:30 AM. Did Mendel Cheat?</i> | 3.9 4.1-.8 |

| 13, W | | EXAM 1, material to 9/11 Last day to add/drop or cancel tuition | |
|-----------------|----------|---|------------------------|
| 6 | 15, F | Complementation, X-linkage | 4.9-.13 |
| 7 | 18, M | Linkage groups, recombination and mapping | 5 (all) |
| 8 | 20, W | Genetic mapping in haploid organisms * 10th edition, posted | 5.10-.11* |
| 9 | 22, F | The genetics of bacteria | 6.1-.5 |
| 10 | 25, M | Viruses, recombination in viruses | 6.6-.9 |
| 11 | 27, W | Sex determination, sex chromosomes and dosage compensation Last day to drop without record | 7.1-.3, 7.5-.7 |
| 12 | 29, F | Variations in ploidy | 8.1-.4 |
| Oct 2, M | | EXAM 2 Includes material 9/15 – 9/29 | |
| 13 | Oct 4, W | Duplication, deletion, translocation and inversion | 8.5-.9 |
| 14 | 6, F | Extranuclear inheritance | 9 (all) |
| 15 | 9, M | DNA as the genetic material | 10.1-.7 |
| 16 | 11, W | DNA replication Problem set due 11:30 AM. Watson, Crick, Pauling and Cory | 11.1-.5 |
| 17 | 13, F | Replication in eukaryotes | 11.6-.7 |
| 18 | 16, M | Recombination | 11.8 |
| 19 | 18, W | Chromosome composition, organization and topology | 12 (all) |
| 20 | 20, F | Hybridization, C_0t analysis, genome complexity | 10.10, 21.6,.7 |
| 23, M | | Exam 3 Includes material 10/4 – 10/20 | |
| 21 | 25, W | Biotechnology: vectors, cloning, libraries, CRISPR | 20.1-2, .4 p.688-90 |
| 22 | 27, F | PCR and sequencing | 20.3,.5 |
| 23 | 30, M | The genetic code | 13.1-.6 |
| 24 | Nov 1, W | Transcription, mRNA splicing | 13.8, .10-12 |
| 25 | 3, F | Translation | 14.1-.2, 14.4 |
| 26 | 6, M | Proteins Problem set due 11:30 AM. Public databases. | 14.5-.10 |
| 27 | 8, W | Mutation | 15.1-.5 |
| 28 | 10, F | Repair | 15.6-.7 |

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|-------------------|--|---|--------------------------|
| Nov 12 | Last day to request withdrawal. Letter grades issued after November 12. | | |
| 29 | 13, M | Control of gene expression in prokaryotes | 16.1-.6 |
| 30 | 15, W | Control of expression in eukaryotes | 17.1-.7 18.8 |
| Nov 17, F | EXAM 4 Includes material 10/25 through 11/15 | | |
| 31 | 20, M | RNA silencing Assignment due 11:30 AM. Eyeless and Gal4. | 17.8 p.690-92 |
| Nov. 22-26 | Holiday | | |
| 32 | 27, M | The genetics of development | 18.1-.5 |
| 33 | 29, W | Cell cycle | 2.3, 19.1-.3 |
| 34 | Dec 1, F | Cancer | 19.4, .6, .8 p.679-81 |
| 35 | Dec 4, M | Forensics and genomics Assignment due 11:30 AM. Basis of cancer prevalence. | 21.1-.5 p.701-07 |
| 36 | 6, W | The maleable genome | 15.8, 17.9 |
| 37 | 8, F | Make up lecture | |
| Dec 11, M | EXAM 5 covers material 11/20 to 12/8 | | |

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| Dec. 18 | Final Comprehensive Exam (Bring Scantron) 10:15-12:15 AM, 146 DeRoy |
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Dates you should be aware of:

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|----------------|---|
| Sept. 13 | <u>First Exam.</u> Last day to <u>drop and receive tuition refund</u> |
| Sept. 27 | <u>Deadline to drop with no record of enrollment.</u> Students dropping after this date will receive WP or WF on their transcripts. |
| Nov. 12 | Last day to withdraw. After November 13 a <u>letter grade</u> will be issued. |
| Dec. 18 | Final comprehensive exam, December 18, 10:15-12:15 in 146 DeRoy. |

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

Lecture: The lecture schedule is tentative. A make up day has been scheduled, but 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 5 closed-book preliminary examinations during regular class periods. Each will include material covered since the last exam. No calculators, or other electronic devices, will be necessary or allowed during exams. Exams will be multiple choice, problem solving and essay questions. The format may vary from exam to exam. Grades will be posted in the BlackBoard grade book as soon as possible. There will be a comprehensive, multiple-choice final during exam week. Midterms are 100 points; the final is 200 points.

While facts are important, emphasis will be placed on understanding and applying genetic concepts. All exams will require problem solving and, except for the final, 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 e-mail at least 48 h prior to the exam.

A single low or missed preliminary exam score will be replaced by the percentile grade achieved on the curved, comprehensive final, if the final is higher. For example, if you skipped one exam due to illness and your curved final is 150 (75% of 200), the missed grade will be replaced by 75. If you took all exams, the lowest score will be replaced, if the percentile grade on the final is higher. If you miss one exam and do poorly on another, only the missed exam will be replaced. Replacement will be done automatically.

Regrading: Errors occur in grading exams and reporting scores. If you believe a grading, calculating or reporting error has affected your grade, attach a written explanation of the problem to the exam and returned to your TA within one week of when the exam was handed back to your section. Pencil answers with erasures will not be regraded.

Final grade calculation: Each midterm is 100 points and the final is 200 points. Scores for every 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 grades will be done. No extra credit will be given under any circumstances.

The total point distribution is as follows:

| | <u>Lecture and discussion</u> | <u>Honors Lab sections</u> |
|-------------------------|-------------------------------|----------------------------|
| Lecture Exams (5 X 100) | 500 | 500 |
| Final Exam | 200 | 200 |
| Discussion/Honors Lab | 100 | 200 |
| Total | 800 | 900 |

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

| Total Points | Grade | Total Points | Grade | Total Points | Grade |
|--------------|-------|--------------|-------|--------------|-------|
| 88%-100% | A | 76%- <78% | B- | 64%- <66% | D+ |
| 86%- <88% | A- | 74%- <76% | C+ | 58%- <64% | D |
| 84%- <86% | B+ | 68%- <74% | C | 56%- <58% | D- |
| 78%- <84% | B | 66%- <68% | C- | <56% | F |

Withdrawal Policy *You may drop without permission or record of enrollment through the 4th week of class.* After Sept. 27 withdrawals will receive WF or WP (failing, passing). WP will be given for those with average exam grades of 56% or higher. WF will be given for averages below 56%. Missed exams count for 0 and the *discussion section grade will not be included.* The deadline to withdraw is November 12. *After Nov. 12, 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, such as (but not limited to) chronic unexcused tardiness, leaving early, disruptive behavior, cell phone conversations, etc., may result in the deduction of points at the discretion of the TA. The discussion section will contribute up to 100 points to the final grade. Discussion grades will be calculated as a percentile 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. *Group study is encouraged because explaining 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 composition is cheating.*

Honors Laboratory: The laboratory grade contributes up to 200 points, based on quizzes, proper participation in the lab, lab notebooks and a 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 have a lab notebook with you for each lab. The notebook must be bound (e.g., a composition book). In the notebook, you must prepare complete notes of protocols or other information necessary to do the day's experiment **before you enter the lab.** You are to enter the data from your observations into the 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: A student discovered cheating during an exam, quiz or assignment (using an electronic device or "cheat sheet", looking at another's paper, or allowing another to look at their paper) will receive a 0 for that portion of the course, with no option for replacement. A second incident of cheating will result in an **F for the course.** Students who plagiarize assignments in the lab or discussion section will receive a 0 for that assignment. A second incident of plagiarism, or another form of cheating, will result in an F for the course. A written report documenting the student's actions will be sent to the Office of the Dean of Students whenever a student's grade is lowered for cheating.

Students 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. SDS telephone number is 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 during my office hours 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 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. 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 on the next regularly scheduled class day. If the university is closed on December 11, no rescheduling of the last preliminary exam will be possible. Grades will be calculated on the basis of the four preliminary exams already taken and the final. Closure of the University is announced by the following mechanisms:

1. the University Newslines (313) 577-5345 *
2. WSU Homepage (www.wayne.edu) *
3. WSU Pipeline (www.pipeline.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

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".