

Syllabus for
PLSC, BIOL, BOT, ZOO 315 - Genetics/ONLINE
Fall 2009 - 3 credits - North Dakota State University

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Course Description:

Study of the basis of heredity with emphasis on structure and function of DNA and Mendelian genetics.

Course Objectives:

- Have a broad background in understanding genetics.
- Appreciate the interdisciplinary relationship of genetics to biology, chemistry, ethics, economics, mathematics, medicine, etc.
- Provide a background for increased understanding of current societal topics involving genetics.
- Be able to assist others in understanding genetics.
- Provide a base for further study in genetics.

Computer Requirement: Access to a computer with internet connection is required. A high speed connection may be necessary to view the lecture videos.

Web Access: Course information, grades, and other materials are available via Blackboard (<http://blackboard.ndsu.nodak.edu/>). This online course utilizes videos from the on-campus Genetics 315 course at North Dakota State University. Access to these videos is through the Blackboard site or directly at <http://www.ndsu.nodak.edu/ndsu/pkianian/GeneticsVideo/>. A 'User name' and 'Password' will be provided, and RealPlayer is used for viewing. This syllabus, for the online course, replaces the on-campus syllabus presented in the videos.

General Education:

This course has been approved for meeting General Education requirements under the following learning outcomes:

- General Education Outcome #5: Comprehend concepts and methods of inquiry in science and technology, and their applications for society. This course meets Outcome #5 because it addresses basic and applied genetic investigation techniques along with the influence of genes and genetic information on individual people, families, and society.
- General Education Outcome #6: Integrate knowledge and ideas in a coherent and meaningful manner. This course meets Outcome #6 because it incorporates the areas of transmission genetics, cytogenetics, molecular genetics, and population genetics into the study of individual genetic problems, investigations, and solutions.

Optional Textbook: *Essentials of Genetics*, Sixth Edition, by W.S. Klug, M.R. Cummings, and C.A. Spencer

- This optional book is recommended for students who would like a review of fundamentals, additional background information, a second presentation of material, or expanded coverage of topics. It is available through the NDSU Bookstore (701-231-7761 or 1-800-428-8309; <http://www.ndsubookstore.com/>).

Assessment:

Pre-test

- Due before 9:00 a.m. (CDT) on September 2, but please complete and submit prior to watching the August 31 video
- Posted on Blackboard
- Not graded but worth 2 extra-credit points just for doing it

Exam 1

- Available September 30-October 4
- 50-minute, non-comprehensive exam
- 50 multiple-choice questions and worth a total of 100 points

Exam 2

- Available October 21-25
- 50-minute, non-comprehensive exam
- 50 multiple-choice questions and worth a total of 100 points

Exam 3

- Available November 20-24
- 50-minute, non-comprehensive exam
- 50 multiple-choice questions and worth a total of 100 points

Optional Open Exam

- Due by 1:00 p.m. (CST) on November 25 (distributed about November 9)
- Includes essay-type questions and is worth a total of 100 points
- Your score on this exam may be used to replace Exam 1, 2, or 3 (not the Final Exam)
- Covers all material through Exam 3
- You may refer to any resource (notes, book, internet, person, etc.)
- Your answers must be your own (it's OK to work with others, but answer the questions in your own words and do not copy someone else)

Post-test

- Due prior to taking the Final Exam
- Will be posted on Blackboard
- Not graded but worth 2 extra-credit points just for doing it

Final Exam

- Available December 16-20
- Two-hour exam
- 50 multiple-choice questions and worth a total of 100 points
- Not comprehensive

Exams will be based on material presented in the lecture videos or posted on Blackboard. Exams 1, 2, 3 and the Final Exam are non-comprehensive and will cover approximately one quarter of the course material, with coverage beginning where the previous exam left off. However, the nature of the course requires that earlier material often be used as a basis for expanded coverage. The Optional Open Exam will cover all material through Exam 3.

Except for the Optional Open Exam, all exams must be completed individually and you will not be allowed to access books, notes, electronic devices, or other sources of information unless otherwise instructed. You will be informed if calculators are allowed on a particular exam. If allowed, calculators must only be used for basic calculating, i.e., no storage or retrieval of formulas or other information. Missed exams will count as a zero, but you may use the Optional Open Exam to replace either Exam 1, 2, or 3 (not the Final Exam). An additional make-up exam may be allowed due to university-related conflicts or exceptional circumstances. Please see the instructor for approval and arrangements.

Students living in the Fargo-Moorhead area will take exams on the NDSU campus unless alternative arrangements are made. Multiple options for exam times will be offered, and every effort will be made to accommodate student schedules. Specific arrangements will be made prior to each exam. Students outside the Fargo-Moorhead area or who otherwise can't come to campus may use Blackboard to take the multiple-choice exams described above, provided that an adequate means of monitoring can be identified (arrange for a proctor, use of webcam, etc.). Online students may also request alternative assignments to replace the multiple-choice exams. Grading of these assignments may include one-on-one discussion with the instructor via phone or Wimba. The request for an alternative assignment must be made at least one week prior to the period when the corresponding exam is first available (see above).

The following point totals are a guide for letter grades.

360-400	A
320-359	B
260-319	C
200-259	D
199 or less	F

Accommodations:

Any students with disabilities or other special needs, who need special accommodations in this course, are invited to share these concerns or requests with the instructor as soon as possible.

Dishonesty:

The College of Agriculture, Food Systems, and Natural Resources operates under an Honor System (<http://www.ag.ndsu.edu/academics/honor.htm>), which believes that a student has the privilege and responsibility to perform honestly and responsibly. Exams will include the following pledge, which students are required to sign before their exam will be accepted: "On my honor I have neither given nor received aid in completing this assignment." An indication of dishonesty will be referred to the Honor Commission made up of students. The instructor also retains the privilege of deducting points if he deems that the action is warranted. All work in this course must also be completed in a manner consistent with NDSU University Senate Policy, Section 335: Code of Academic Responsibility and Conduct (<http://www.ndsu.nodak.edu/policy/335.htm>).

Projected Order of Topics (and corresponding sections in optional textbook):

Large text and underlined: Textbook fits well with lecture topics

Small text: Only some of the textbook material will be covered in lecture

Introduction to Genetics (~ 1 lecture)

Chap. 1 - All

Mendelian Genetics and Mitosis/Meiosis (~ 5 lectures)

Chap. 3: Intro-3.3, 3.4

Chap. 2: Intro, 2.2, 2.3, 2.4

Chap. 3: 3.5, 3.7-3.9

Modification of Mendelian Ratios (~ 3 lectures)

Chap. 4: Intro-4.6, 4.7-4.8, 4.11-4.12

Sex Determination and Sex Chromosomes (~ 4 lectures)

Chap. 4: 4.10

Chap. 5: Intro, 5.2-5.6, 5.7

Chromosome Mutations (~ 5 lectures)

Chap. 6: All

Extranuclear Inheritance (~ 1 lecture)

Chap. 2: 2.1

Chap. 4: 4.13, Pages 85-86

DNA Structure and Analysis (~ 1 lecture)

Chap. 9: Intro-9.1, 9.6, 9.7, 9.8-9.9, 9.10

Chap. 17: 17.2, 17.7

DNA Replication and Synthesis (~ 1 lecture)

Chap. 10: Intro-10.6, 10.7, Page 231

The Genetic Code and Transcription (~ 2 lectures)

Chap. 12: 12.8-12.11, Page 272, Intro-12.1, 12.4, 12.6

Translation and Proteins (~ 1 lecture)

Chap. 13: Intro, 13.2, 13.4, 13.5-13.7

Gene Mutation (~ 3 lectures)

Chap. 14: Intro-14.2, 14.5-14.6, 14.8-14.9

Chromosome Structure and DNA Sequence Organization (~ 1 lecture)

Chap. 11: Intro, 11.5-11.6

Chap. 18: 18.5

Chap. 11: 11.1-11.2

Protein and RNA as Genetic Material (~ 1 lecture)

Chap. 13: Pages 297-298

Chap. 9: 9.5

Population Genetics (~ 2 lectures)

Chap. 22: Intro-22.3, 22.4-22.9

Linkage and Chromosome Mapping (~ 2 lectures)

Chap. 7: Intro-7.2, 7.3-7.4, 7.5, 7.9

Recombinant DNA Technology (~ 3 lectures)

Chap. 17: Intro-17.4, 17.7-17.8

Applications and Ethics of Genetic Engineering (~ 4 lectures)

Chap. 19: Intro-19.1, 19.3-19.6

Chap. 17: Pages 393-394

The Genetic Basis of Cancer (~ 1 lecture)

Chap. 16: Intro-16.2, 16.4, Page 371, 16.6-16.7