

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

Instructor: Michael J. Christoffers, Ph.D.
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Office Hours: 3:30-5:00 TW, and by appointment

Class Time, Place: Sec. 1 - 9:00-9:50 a.m. MWF, Loftsgard 114
Sec. 2 - 11:00-11:50 a.m. MWF, Loftsgard 114

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.

Web Access: Grades and other course materials will be available via Blackboard (<http://blackboard.ndsu.nodak.edu/>). Lectures are videotaped and are available for viewing with RealPlayer. You can access the lecture videos through the Blackboard site or directly at <http://www.ndsu.nodak.edu/ndsu/pkianian/GeneticsVideo/>. A 'User name' and 'Password' will be provided in class.

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 at the NDSU Bookstore.

Assessment:

Pre-test

- Due before 9:00 a.m. on August 31
- Posted on Blackboard
- Not graded but worth 2 extra-credit points just for doing it

Exam 1

- September 30
- 50-minute in-class exam
- 50 multiple-choice questions and worth a total of 100 points
- Not comprehensive

Exam 2

- October 21
- 50-minute in-class exam
- 50 multiple-choice questions and worth a total of 100 points
- Not comprehensive

Exam 3

- November 20
- 50-minute in-class exam
- 50 multiple-choice questions and worth a total of 100 points
- Not comprehensive

Optional Open Exam

- Due at the beginning of class 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 before 1:00 p.m. on December 14
- Will be posted on Blackboard
- Not graded but worth 2 extra-credit points just for doing it

Final Exam

- Section 1: December 16, 1:00 p.m.-3:00 p.m.
- Section 2: December 14, 1:00 p.m.-3:00 p.m.
- 50 multiple-choice questions and worth a total of 100 points
- Not comprehensive

Exams will be based on material presented in lecture 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.

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

No class:

September 7 (Labor Day)
November 11 (Veterans' Day)
November 27 (Thanksgiving)

Cancellations:

Cancellation of a class meeting time automatically delays all scheduled activities, including exams, to the next scheduled meeting time.

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.

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