

MOREHEAD STATE UNIVERSITY
PROFESSIONAL EDUCATION UNIT
COLLEGE OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF BIOLOGY AND CHEMISTRY
BIOLOGY 304 - GENETICS
DELIVERY METHOD – TRADITIONAL CLASSROOM
COURSE SYLLABUS – FALL 2009

COURSE: BIOL 304. Genetics (2-2-3) I, II.

TIME AND PLACE: Lect. 10:20-11:20 T & Th in Lappin 311; Lab. 1:50 T or W in Lappin 322

LECTURE INSTRUCTOR: David K. Peyton
LAB INSTRUCTOR: David K. Peyton
OFFICE: 327E Lappin Hall
PHONE: 783-2947
EMAIL: d.peyton@morehead-st.edu
OFFICE HOURS: 10:20-11:20 MWF1

COURSE DESCRIPTION: Mendelian inheritance, chemical nature of DNA and chromosomes, regulation of gene expression, experimental techniques in genetics, human genetic disorders and population genetics.

NUMBER OF REQUIRED FIELDWORK HOURS: 0

“Community Engagement: A Light to and From the Mountains”

The Professional Education Unit at Morehead State University delivers rigorous, high quality programs that prepare professionals informed by best national and international scholarship, plus research, literature, and experiences specific to Appalachia- preparing professionals to improve the schools, quality of life, and the communities in which they live and serve. This statement is not only the strategic mission for the College, but it also incorporates the conceptual framework that guides all our activities.

Conceptual Framework Outcomes (CFOs) :

The Unit and the faculty within individual programs assess the degree to which its graduates:

- 1) Master the content knowledge, professional and the twenty first century skills needed to make an optimal contribution to “whole” student learning in educational settings
- 2) Are competent in the collection and use of data to inform decision- making and to demonstrate accountability for student learning.
- 3) Demonstrate professional dispositions.
- 4) Are culturally competent and understand the regions from which they have come utilizing knowledge and experiences to effectively “bridge the gaps” (economic, achievement, and geographic) ensuring optimal learning for all students.

- 5) Engage in authentic field experiences in collaboration with committed school based partners and are empowered to improve the quality of education throughout this region and beyond.

STUDENT LEARNER OUTCOMES (SLOs) : This course is intended to develop the following fundamental scientific skills and perspectives in candidates:

1. develop the student as an independent learner
2. for each student to develop a highly organized, interconnected, hierarchical understanding of genetic principles
3. understanding of the relationship between structure and function at the molecular, cellular, and organismal levels
4. understanding the linkage between genetic information and pathology
5. understanding the role of genetics in population structure and evolutionary change

NCATE/ EPSB Accreditation Alignment of CFOs and SLOs:

Program:		Biology - teaching		Genetics BIOL 304	
Aligned with→ Assessment↘ (point values)	Kentucky Teacher Standards (KYTS)	Kentucky Department of Education Core Content for Assessment (KDECCA)	Education Professional Standards Board (EPSB)	National Science Teachers Association (NSTA)	NCATE
lecture exams (400) CFO:1 SLO: 1, 3, 4, 5, 6	1,	3, 4	Literacy	1, 2	1
Lecture quizzes (140) CFO: 1 SLO: 1, 3, 5,	1	3, 4	Literacy	1,2	1
Lab quizzes (80) CFO: 1,2 SLO: 1, 2, 4, 7	1	3,4	Literacy	3	1

Assignment Descriptions:

Program: BIOLOGY – SECONDARY TEACHING Genetics (BIOL 304)	
Assessment (point value)	Description
Lecture exams (400)	Lecture exams will assess content knowledge and conceptual understanding of the course material. Exams will be taken during scheduled laboratory time.
Lecture quizzes (140)	Lecture quizzes will assess content knowledge and conceptual understanding of the course material. Exams will be taken during scheduled class time.
Lab quizzes (80)	Lab quizzes will assess content knowledge and conceptual understanding of the laboratory techniques and activities. Lab quizzes will be taken during scheduled laboratory time.

Grading:

Grades are based on the percentage of total points and the following scale: 90-100=A, 80-89=B, 70-79=C, 60-69=D, <60=E. **Final grades will not be curved or adjusted!** The points for each component of your grade are listed below:

Exams	100pts x 4 = 400
Quizzes	10pts x 14 = 140
<u>Lab quizzes</u>	<u>10pts x 8 = 80</u>
Total points possible	620

Grading Scorecard: In the interest of saving time (yours and mine), please keep track of your grades so you may know where you stand at any given point during the semester.

Exam 1	Lab 5	Quiz 1	Quiz 9
Exam 2	Lab 6	Quiz 2	Quiz 10
Exam 3	Lab 7	Quiz 3	Quiz 11
Exam 4	Lab 8	Quiz 4	Quiz 12
Lab 1	Lab 9	Quiz 5	Quiz 13
Lab 2	Lab 10	Quiz 6	Quiz 14
Lab 3		Quiz 7	Quiz 15
Lab 4		Quiz 8	Quiz 16

Required Textbook and Manual: *Introduction to Genetic Analysis*, Griffiths, Wessler, Lewontin, and Carroll (2008); ISBN-13: 978-0-7167-6887-6

Genetics Lab Manual, Peyton, available in the MSU bookstore.

Course Objectives:

The primary course objective for BIOL 304 is to understand the genetic basis of life and the central mechanisms that are behind maintaining the function and fidelity of the DNA code. Virtually every biological activity, normal and pathological, has a genetic origin. This is true for inherited disorders as well as disorders that arise during development or during the lifetime of an individual. By understanding the molecular basis, the biological systems of the body can be seen as an organized collection of chemical events that are choreographed but also susceptible to malfunction and mutation. Your understanding of these principles will be assessed through quizzes, exams, and lab exercises.

Course Policies:

Success in this class will depend on understanding the material, not just memorizing it. If you are unsure about lecture or reading material, make a point to ask a question during or after class. Lab sessions will also provide opportunities to review class material, and I am available in my office for discussion of specific problems or class topics.

Attendance is required and you are expected to read assigned material before class when appropriate. Quizzes given during class and lab time will be a large percentage of your grade. **There is no quiz makeup** but a maximum of two lecture quizzes and two lab quizzes can be missed without penalty (if you are present for all quizzes then the lowest two quiz grades will be dropped). If you take the quiz then leave class, that grade will not be counted. Cheating on a quiz results in a **zero** for the quiz grade.

There are four **exams** (three will be taken during lab sessions, the fourth is the final). Makeup exams (for excused absences only) must be taken the same week as the missed exam. Cheating on an exam will result in a **zero** for that exam. All suspicious activity will be considered cheating.

Please practice **common courtesy** in the classroom. Students are encouraged to speak up and ask questions during class, but please raise your hand so that we are not competing. Please refrain from conversation with your neighbors as this is distracting to those around you who might be more interested in the lecture.

Electronic devices: Other than for recording the lectures, the use of phones or other text messaging devices is prohibited. Make sure that your phone is set so that if you receive a call during class the device will not make any noise or vibrate. Since you will not be reading or sending text messages during class, you should put your phone OUT OF SIGHT in your backpack or purse. There is a clock on the wall that you can use to keep track of the time. **Taking notes on a laptop** during class is discouraged. The temptation to do other things on the laptop is too great, and if you are caught “playing” or doing work for another class you will not be permitted to use the laptop again.

Diversity issues:

This course addresses the diversity of organisms and humans in the context of genetic makeup and inheritance.

Disability statement:

Any student who feels that he/she needs an accommodation for any kind of disability should make an appointment with me as soon as possible in order to discuss this issue or contact Evangeline Day at the campus disability services office at 204-E ADUC, e.day@moreheadstate.edu, 783-5188.

Campus Safety Statement: Emergency response information will be discussed in class. Students should familiarize themselves with the nearest exit routes in the event evacuation becomes necessary. You should notify your instructor at the beginning of the semester if you have special needs or will require assistance during an emergency evacuation. Students should familiarize themselves with emergency response protocols at www.moreheadstate.edu/emergency.

Lecture Schedule for Fall 2009:

<u>WEEK</u>	<u>DATE</u>	<u>CHAPTER</u>	<u>LECTURE TOPIC</u>
-------------	-------------	----------------	----------------------

EXAM 1 Material:

- | | | | |
|----|-----------|--------------|---|
| 1. | Aug 18-20 | Chapter 1 | Introduction, Meiosis |
| 2. | Aug 25-27 | Chapter 2 | Inheritance part I, Mendelian patterns |
| 3. | Sep 1-3 | Chapters 3,6 | Inheritance part II, Non-Mendelian patterns |
| 4. | Sep 8-10 | Chapter 16 | Chromosomal abnormalities |

EXAM 2 Material:

- | | | | |
|----|--------------|-----------|--|
| 5. | Sep 15-17 | Chapter 7 | DNA structure and replication |
| 6. | Sep 22-24 | Chapter 8 | Transcription |
| 7. | Sep 29-Oct 1 | Chapter 9 | Translation |
| 8. | Oct 6 | Chapter 9 | Finish central dogma (Thursday and Friday are FALL BREAK) |

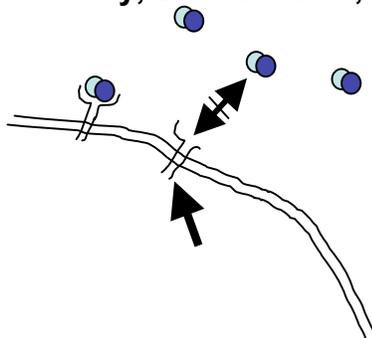
EXAM 3 Material:

- | | | | |
|-----|-----------|------------|--------------------------------|
| 9. | Oct 13-15 | Chapter 10 | Gene regulation in prokaryotes |
| 10. | Oct 20-22 | Chapter 11 | Gene regulation in eukaryotes |
| 11. | Oct 27-29 | Chapter 12 | Hox genes in development |
| 12. | Nov 3-5 | Chapter 13 | The Genome |

EXAM 4 Material:

- | | | | |
|-----|-----------|------------|---|
| 13. | Nov 10-12 | Chapter 15 | Mutation and repair |
| 14. | Nov 17-19 | Chapter 15 | Cancer and the cell cycle |
| 15. | Nov 24 | Chapter 17 | Population genetics (Wednesday-Friday is Thanksgiving Break) |
| 16. | Dec. 1-3 | Chapter 19 | Evolution |

***** Final Exam: **Tuesday, December 8th, 10:15am**



Lab Topics for Fall 2009:

<i>WEEK</i>	<i>DATE</i>	<i>TOPIC</i>
1.	Aug 18-19	Module 1. Introduction, pipetting, lab overview
2.	Aug 25-26	Module 2. Human DNA isolation, PCR reaction with human primers
3.	Sep 1-2	Module 3. Gels, ligations, and second chance PCR's
4.	Sep 8-9	Module 4. Transformation, X-gal selection and screening
5.	Sep 15-16	Exam 1 given during lab meeting
6.	Sep 22-23	Module 5. Inoculation, and second chance transformations
7.	Sep 29-30	Module 6. Mini-preps and digests of candidate clones
8.	Oct 6-7	Module 7. Clone identification and sequence-grade DNA preps
9.	Oct 13-14	Exam 2 given during lab meeting
10.	Oct 20-21	Module 8. Check qia-preps, set up sequencing reactions
11.	Oct 27-28	Module 9. Set up sequencing gel, bioinformatics [BRING LAPTOPS!]
12.	Nov 3-4	Sequence analysis of database sequence [BRING LAPTOPS!]
13.	Nov 10-11	Exam 3 given during lab meeting
14.	Nov 17-18	Module 10. Final assessment of MC1R alleles [BRING LAPTOPS!]
15.	Nov 24-25	Thanksgiving Break – no labs this week
16.	Dec 1-2	Hardy-Weinberg exercise, skills assessment