BIO 343 GENETICS
LECTURER: Dr. Lisa Dorn

OFFICE: HS 45; LAB: HS 47/50 PHONE: 424-3064; E-MAIL: dorn@uwosh.edu
OFFICE HRS: Posted to D2L
LECTURE HOURS: 11:30 to 12:30 am in Halsey Science Building; Rm.260

TEXT: **Brooker, Genetics: Analysis & Principles (5th edition or Custom Book or ebook)** McGraw Hill.

OBJECTIVES: Genetics and its experimental methods is one of the broadest and most rapidly evolving fields of science. I cannot possibly cover it all, so my goal is to teach you how to think like a geneticist while learning genetics concepts so that you can judge for yourself the value of emerging genetic technologies and discoveries. This course covers Mendelian genetics and its complications, the molecular basis of genes and their effect on phenotypes, the methods of identifying and characterizing the genetic basis of diseases and other phenotypes as well as population and evolutionary genetics.

The prerequisites for this course are Bio105 and 323, which by extension means you have taken Chem 105 and 106. The laboratory part of this course will expand on what you have learned in Molecular and Cell Biology (Bio 323). I will assume you have mastered the Bio323 material and will not waste much time reviewing this material but there will be some review of 323 materials in lab.

If you become seriously ill (depression counts), are the victim of a crime or your family life becomes chaotic for whatever reason you should talk to me as soon as you can. Be aware there are some excuses I'm not very sympathetic to, e.g. "My fiancée scheduled my tux fitting during the exam"--this is so wrong on so many levels; don't get me started**.** I make no promises but I cannot help you if I don't know what's going on. I know it's hard and maybe embarrassing (I am discrete), but when I make accommodations for students in disarray I have to weigh the fairness to other students. If you tell me the day before the exam or after it, it's hard for me to judge if you're a slacker or truly in trouble.

ASSESSMENT: How are you going to earn your grade?

EXAMS: 4 exams each worth 100 points. They will be mostly problems similar to those in your D2L quizzes. (400 total points).

Note: For exams you will need a calculator. YOU CANNOT USE YOUR PHONE AS A CALCULATOR ON EXAMS.

CONNECT ONLINE EXERCISES: These are interactive exercises intended to help you understand the fundamentals of the concepts you will be working with in the D2L quizzes and exams. There will be **4 interactive sessions** though MHHE they are worth **5 points each (total = 20 points**). They will be available at the same time as the D2L

quizzes. However, in contrast to the D2L problems you do not need to do all exercises to gain the 5 points or even get the right answer. You must attempt at least 10 exercises to get the full points. You can do those exercises over and over if you think they will help you.

PROBLEM SOLVING: There will be **4 D2L** problem-solving sessions where you will be required to solve problems that will be available on D2L. They are **worth 15 points each (total = 60 points)**. These problems are presented as quizzes that will be available in the weeks preceding each exam. During that time you may open it, print it and discuss potential solutions with your peers and me (I will specifically work on some of them in lecture but I don't know when). On the day that the quiz is due you have until 10:30pm to submit your quiz. After that 10:30 pm time you have a 6 hr grace period to submit late (i.e. until 5:30 am the following morning). After that, you lose 1 pt for every hour the quiz is late. THE QUIZ CLOSES AT 10:30PM **THE DAY AFTER IT IS DUE** AT WHICH POINT THE GRACE PERIOD IS OVER! You can make up some or all of those lost points at the end of the semester with the extra credit quiz depending on how many quizzes you miss.

You should *save* the answers as you enter them. You can still change answers even after saving but once you submit the quiz you cannot make any more changes. You can see the answers 1 day after the late submission deadline.

*****IMPORTANT***:** D2L can be temperamental. **Do not wait for the last hour to submit your answers.** D2L tells me when you are logged on, if you tried to submit a quiz and even if you have opened the quiz.

Excuses for waiving late submission penalties that **will NOT be accepted** include:

- D2L problems in the last hour before the deadline.
- I forgot to save my answers
- I forgot after I went to work
- My internet service at home failed.

BUT if you have submitted by the deadline and D2L fails to recognize your submitted quiz send me an e-mail. In most cases, I have your quiz and can force D2l to accept it.

EXTRA CREDIT QUIZZES: There will be **one** extra credit quiz at the end of the semester worth **5** points. Besides the extra credit, it will be very similar to questions you will find on the last exam so I highly recommend that you do this. ***NOTE**: Extra credit points from this quiz can be used to pass the course but, you may have other opportunities for extra credit points that may change your letter grade but these EC points cannot be used to **pass** the course.

LABORATORY: Is worth **105 points**. The lab syllabus is appended to the end of this document.

LABORATORY ATTENDANCE: You will lose 5 pts on a report for every unexcused absence during the weeks of that reports exercise(s). Being on time to lab is

also important. If you are more than 20 minutes late we will simply mark you as absent. Make sure that your requests to be excused are **e-mailed to Dr. Dorn or Mr. Bosma**.

Total Possible points = 400 + 60 + 20 + 105 = 585.

GRADING SCALE:
A = 93 - 100%,
A- = 90 - 92.9%
B+ = 88 - 89.9%
B = 83 – 87.9%
B- = 80 - 82.9%
C+ = 78 - 79.9%
C = 73 - 77.9%
C- = 70 – 72.9%
D+ = 68 – 69.9%
D = 63 - 67.9%
D- = 60 - 62.9%
F (Failure) < 60%
Grades may be "curved" at the end, if necessary.

Disputing a grade: if you feel your exam has been misgraded, you must submit to me a request for re-grade within a week of the day I have passed exams back (not the day you picked it up). That request must be in writing accompanied by a copy of the exam in question that I will keep.

Students With Disabilities are welcome in this class! If you need special accommodations please contact me during office hours in the first week of class. This includes students with diagnosed learning disabilities. If you feel you should be evaluated for a learning disability, please contact the **Project Success** office at 920 424-1033 or go to their website at http://www.uwosh.edu/organizations/success.

Classroom Etiquette: please silence all pagers, cell phones; or iPODs etc.and do not talk or whisper unless called upon in turn (but feel free to raise your hand for a question or comment at ANY time!). Please do not text during my lectures. If you find me that boring just don't bother to come. Texting is more disruptive than you suspect and wastes both my time and your money.

Incomplete Grades may be given in extreme circumstances, such as when a student becomes too ill to complete the semester's work. Please talk to me if you think your situation warrants an "I" grade and be prepared to provide documentation.

Make up exams. If you cannot make one exam several alternatives may be available to you depending on the rest of my teaching obligations at that time. I will do what I can, given your circumstance. If you know ahead of time that you must miss an exam (for instance if your job requires that you work that day or you are a participant in a university sponsored event) please let me know ahead of time. Although the University of

Wisconsin, as an institution, does not observe religious holidays, I will make a reasonable effort to accommodate your religious obligations. Again, you need to ask and I will figure out what I can reasonably do. Absence from classes or examinations for religious reasons does not relieve students from responsibility for any part of the course work required during the period of absence. Should disagreement arise over any aspect of this policy, the parties involved should contact the Department Chair or the Dean of Students. Final appeals will be resolved by the Provost.

The schedule of lectures, exams and due dates for D2L and connect exercises starts on the next page.

There may be minor changes to this schedule of lectures without notice. I will announce such changes in class. Exams and quizzes will stay on schedule unless (for quizzes) there are problems with D2L.

Lec #	Day	Date	Topics		Book	Week
1	Wed	**7-Sep**	Mendels Laws; Monohybrids & Dihybrids		Ch2	**1**
2	Fri	**9-Sep**	Dihybrids & Pedigrees		Ch2	**1**
3	Mon	**12-Sep**	Pedigrees; Probability		Ch2	2
4	Wed	**14-Sep**	Chi-Square Chromosomes Sex-Linkage		Ch 3	2
5	Fri	**16-Sep**	Sex Determination; Meiosis		Ch 3	2
6	Mon	**19-Sep**	Complete Dominance, Incomplete Dominance		Ch 4	3
7	Wed	**21-Sep**	Incomplete Penetrance, Co-Dominance,		Ch 4	3
8	Fri	**23-Sep**	Overdominance,Pleiotropy, Lethal Alleles;		Ch 4	3
9	Mon	**26-Sep**	Overdominance,Pleiotropy, Lethal Alleles;		Ch 4	4
10	Wed	**28-Sep**	Complementation, Epistasis	**Quiz 1 Due**	Ch 4/6	4
	Fri	**30-Sep**	**EXAM 1 (covers up to lecture 9)**			4
11	Mon	**3-Oct**	Linkage and Recombination		Ch 6	5
12	Wed	**5-Oct**	Mapping genes: dihybrid crosses		Ch 6	5
13	Fri	**7-Oct**	Mapping genes: Trihybrid crosses		Ch 6	5
14	Mon	**10-Oct**	Mapping genes: Trihybrid crosses		Ch 6	6
15	Wed	**12-Oct**	Chromosomes: Change in Number		Ch 08	6
16	Fri	**14-Oct**	Chromosomes: Structure; Variation & Mutations		Ch 08	6
17	Mon	**17-Oct**	Chromosomes: Translocations & Aneuploidy		Ch 08	7
18	Wed	**19-Oct**	Chromosomes: Translocations & Aneuploidy		Ch 08	7
19	Fri	**21-Oct**	Chromosomes: Polyploidy	**Quiz 2 Due**	Ch 08	7
	Mon	**24-Oct**	**EXAM 2 (covering lectures 10 to 18)**			8
20	Wed	**26-Oct**	Genomics		Ch 20	8
21	Fri	**28-Oct**	Genomics		Ch 20	8
22	Mon	**31-Oct**	Transcription & Post-Transcriptional Processing		Ch 12	9
23	Wed	**2-Nov**	Post-Transcriptional Processing		Ch 12	9
24	Fri	**4-Nov**	Post-Transcriptional Processing		Ch 12	9
25	Mon	**7-Nov**	Transcriptional Regulation in Eukaryotes		Ch 15	10
26	Wed	**9-Nov**	Transcriptional Regulation Chromatin & RNAi		Ch 15	10
27	Fri	**11-Nov**	Gene Mutation		*Ch 16*	10

28	Mon	**14-Nov**	Gene Mutation		*Ch 16*	11
29	Wed	**16-Nov**	Non-Mendelian Inheritance: X-inactivation	**Quiz 3 Due**	*Ch5*	11
	Fri	**18-Nov**	**EXAM 3 (Lectures 19 to 28)**			11
30	Mon	**21-Nov**	Non-Mendelian Inheritance: Imprinting		Ch5	12
32	Wed	**23-Nov**	**THANKSGIVING; NO LECTURE, NO LABS**			12
33	Fri	**25-Nov**	**THANKSGIVING; NO LECTURE, NO LABS**			12
34	Mon	**28-Nov**	Population Genetics: HW		Ch 24	13
35	Wed	**30-Nov**	Population Genetics:Drift		Ch 24	13
36	Fri	**2-Dec**	Population Genetics Variation		Ch 24	13
37	Mon	**5-Dec**	Population Genetics Inbreeding		Ch 24	14
38	Wed	**7-Dec**	Population Genetics Natural Selection		Ch 24	14
39	Fri	**9-Dec**	Population Genetics Natural Selection		Ch 24	14
40	Mon	**12-Dec**	Population Genetics/ Revie	**Quiz 4 Due; EC Quiz Due**	Ch 24	15
	Wed	**14-Dec**	**EXAM 4 (Lectures 29-39)**			15
	Fri	**16-Dec**	Alternate Exam Day: (May take the exam Wed or Fri)			15

Genetics Lab Syllabus

Instructors:
Lisa Dorn, HS45; dorn@uwosh.edu
Andrew Bosma, HS 39; bosmaa@uwosh.edu
Section A01L: Tues 9:40am – 11:40 am in HS 50, Dorn
Section A02L: Tues 1:20 pm – 3:20 pm in HS 50, Dorn
Section A03L: Thurs 9:40 – 11:40 am in HS 50, Bosma

OBJECTIVES: Welcome to the laboratory portion of Biology 343. This course is designed to give you hands-on experience with modern genetics techniques. It is not designed to coincide very much with your lecture material but it will on occasion. You will learn molecular lab techniques that are useful for genetics, learn to debug those techniques, as well as how to interpret your results and what that means for understanding genes and their function. These exercises are based on molecular biology concepts you should have learned in 105 and 323. Therefore, we will use some lab time to review those molecular biology concepts. Despite this courses position as a core course there are only two hours a week devoted to laboratory. That means that your exercises will stretch out over a period of weeks. We will help you keep track. It may help if you use the schedule presented below as a checklist.

ORGANIZATION: The course consists of three basic sections or "modules". Within each module are a series of exercises designed to teach the topics covered by that module. The first module *Basic Lab Techniques* teaches the basic techniques you will need for the rest of the semester. For some of you with experience in professors' labs this module will be ***very basic*** at times. Please be patient. Remember this course is a required course for all biology majors even those who are not pursuing research that requires these techniques. Those of you with research experience may find that using your expertise to help less-experienced students a useful exercise. Last, some of these exercises are designed to at least partially fail so do not get discouraged.

GRADING: The lab part of the course is worth **105** points toward your total grade. There are four quizzes and five reports as shown in the table below.

Quiz/ Report		Points
Quiz 1: Nucleic Acids Review		10
Quiz 2: Replication		10
Report 1: Electronic PCR		10
Quiz 3: Optimization/ Polymorphisms		20
Report 2a: Polymorphisms Predicted		12
Report 2b: Polymorphisms Actual		3
Report 3: Marker Map		10
Quiz 4: Gene Expression		10
Report 4a: RT-PCr Predictions		2
Report 4b rt PCR GenBank &Actual		8
Report 5: Gene Families		10
	Total points	105

Day	Date	Lab	Reports Due	Quizzes Due	Wet Lab Exercises	Computer Exercise	Notes
Tue	**6-Sep**						
Thurs	**8-Sep**				**NO LABS**		
Tue	**13-Sep**	1			Pipettor Exercise,		
Thurs	**15-Sep**	1			Make Buffers		
Tue	**20-Sep**	2		Quiz 1	Extracting DNA		
Thurs	**22-Sep**	2					
Tue	**27-Sep**	3			Quantify DNA	Electronic PCR:	**Quiz 2 Available**
Thurs	**29-Sep**	3					
Tue	**4-Oct**	4			PCR Optimization	Electronic PCR:	
Thurs	**6-Oct**	4					
Tue	**11-Oct**	5	Report 1: electronic PCR	Quiz 2	Optimization Gel	Predict Polymorphism Pt. 1	
Thurs	**13-Oct**	5					
Tue	**18-Oct**	6			Interpret Opt Gel, Polymorphism Screen	Predict Polymorphism Pt. 2	Discuss polymorphisms
Thurs	**20-Oct**	6					
Tue	**25-Oct**	7	Report 2a: Polymorphism Predictions		Polymorphism Gel	Predict Polymorphism Pt. 2	
Thurs	**27-Oct**	7					
Tue	**1-Nov**	8	Report 2b: Actual Polymorphisms		Interpret Poly Gel	Draw Recombinants	**Quiz 3 Available**
Thurs	**3-Nov**	8					
Tue	**8-Nov**	9		Quiz 3: Opt/Poly	RT Reaction	Interpret Mapping Gel Pictures	Handout mapping gel pictures
Thurs	**10-Nov**	9					
Tue	**15-Nov**	10	Report 3: Marker Map		PCR part of RT-PCR	Predict RT-PCR	
Thurs	**17-Nov**	10					
Tue	**22-Nov**		**Thanksgiving**		**NO LABS**		
Thurs	**24-Nov**						
Tue	**29-Nov**	11	Report 4a: RT-PCR		RT-PCR gel	GenBank Exercise	**Quiz 4 Available**
Thurs	**1-Dec**	11					
Tue	**6-Dec**	12	Report 4b: RT-PCR	Quiz 4: Gene Expression	Interpret rt-PCR gel	Gene Families	Examine RT-PCR gels
Thurs	**8-Dec**	12					
Tue	**13-Dec**	13	Report 5: Gene Families		None	None	
Thurs	**15-Dec**	13					