

Principles of Genetics: Genetics 466 Syllabus, Fall 2016

COURSE DESCRIPTION:

The science of genetics, launched with the rediscovery of Mendel's Principles of inheritance in 1900, is very much in the news. Within the subject of Genetics there are more areas than can be covered in a semester. We've picked out many of the basic concepts that we think are important in a broad introductory survey course.

- 1) Transmission genetics in higher organisms, using classical analysis of crosses.
- 2) Molecular genetics in the DNA age, the molecular nature of the gene and gene expression. This includes the biochemical nature, function and organization of the genetic material using the approaches of molecular genetics.
- 3) Population genetics and the distribution of genes in real populations.

Interspersed will be topics from the modern era: Genetic engineering, forensic techniques, recombinant DNA technology and genomics.

INSTRUCTORS:

Christopher (Kit) Tilmann 1428 Genetics
cetilmann@wisc.edu 263-7380
Office hours: by appointment

Chris Day 2422 Genetics
chris.day@wisc.edu 265-2865
Office hours: by appointment

TEACHING ASSISTANTS:

4 students TBA Office hours: by appointment

CLASS:

MWF 11AM-11:50AM in TBA

OFFICE HOURS:

TBA or by appointment with all three instructors.

COURSE WEB SITE: Login at learnUW.wisc.edu and navigate to the Genetics 466 course site. Course content, discussion boards, quizzes and the gradebook will be found at this site.

RECOMMENDED TEXTS:

Introduction to Genetic Analysis, 11th Edition by Griffiths, Wessler, Carroll and Doebley (2015), W. H Freeman and Company. ISBN 1-4641-0948-6

Solutions Manual for Introduction to Genetic Analysis, 11th Edition by Brewster, Davison, Jamburuthugoda and Meade (2015) W.H. Freeman and Company. ISBN 1464187940

DISCUSSION SECTIONS:

Will not meet the first week

Subsequent weeks: 1 hour solving problems in small groups and/or TA-led discussion

Time / Day Location

301 12:05 Monday

302 11:00 Tuesday

303 12:05 Tuesday

304 1:20 Tuesday

305 1:20 Wednesday

306 9:55 Thursday

307 1:20 Thursday

308 12:05 Friday

EXAMS: You are allowed notes that will fit on a 3x5 inch notecard (both sides can be used), but you must turn the card in with your exam (you can get it back after the exam is graded). You are allowed a calculator (nonprogrammable) but no cell phones or ipods.

Evening Exam 1, 7:15-9:15 PM, covering lectures 1-11

Evening Exam 2, 7:15-9:15 PM, covering lectures 12-23

Evening Exam 3, 7:15-9:15 PM, covering lectures 24-33

Final, TBA, covering lectures 1-43

GRADING: The four exams will be weighted equally (100 points each).

Grading Scale:

A	90%
AB	86-89%
B	80%
BC	76-79%
C	70%
D	60%
F	<60%

ASSIGNED PROBLEMS: Homework problems are assigned to help you understand the material and prepare for the exams. Homework will not be collected or graded but IT IS HIGHLY ADVISABLE TO DO THE PROBLEMS at the end of each chapter. Many exam questions will be problem-oriented.

SUGGESTED READINGS: It is highly advisable to read the suggested sections of the textbook before every lecture. This will help in understanding the material presented during the lectures. Exams will be on the material discussed during the lectures, and in the related problems. Hence, it is also highly recommended to attend all lectures and assigned discussion sections.

Lecture		Date	Topics	Suggested Reading	Instructor
1	F	Sept 2	Introduction		Tilman/Day
Part 1: Transmission Genetics					
2	W	Sept 7	Cell Cycle, Mitosis and Meiosis,	Ch2, Ch3	Tilman
3	F	Sept 9	Mendelian Inheritance	Ch2, Ch3	Tilman
4	M	Sept 12	Probability;	Ch3: 3.2	Tilman
5	W	Sept 14	Hypothesis Testing	Ch3 3.2	Tilman
6	F	Sept 16	Sex Linkage,	Ch2: 2.5 Ch3: 3.3	Tilman
7	M	Sept 19	Human Pedigree Analysis	Ch2: 2.6	Tilman
8	W	Sept 21	Cytoplasmic Inheritance	Ch3: 3.5	Tilman
9	F	Sept 23	Recombination & Mapping	Ch4	Tilman
10	M	Sept 26	Gene Interaction I	Ch6	Tilman
11	W	Sept 28	Gene Interaction II	Ch6	Tilman
Part 2: Central Dogma					
12	F	Sept 30	DNA Structure	Ch7: 7.1, 7.2	Tilman
13	M	Oct 3	DNA Replication	Ch7: 7.3-7.7	Tilman
Evening Exam 1, 7:15-9:15 PM, covering lectures 1-11					
14	W	Oct 5	Transcription	Ch8: 8.1-8.3	Tilman
15	F	Oct 7	RNA processing	Ch8: 8.4-8.5	Tilman
16	M	Oct 10	Translation	Ch9: 9.3-9.5	Tilman
17	W	Oct 12	Genetic Code	Ch9: 9.2	Tilman
18	F	Oct 14	Gene isolation and manipulation	Ch 10: 10.1-10.3	Tilman
19	M	Oct 17	Gene isolation and manipulation	Ch 10: 10.4-10.6	Tilman
20	W	Oct 19	Gene Regulation in Prokaryotes	Ch 11: 11.3-11.4	Tilman
21	F	Oct 21	Gene Regulation in Prokaryotes	Ch 11: 11.5-11.7	Tilman
22	M	Oct 24	Gene Regulation in Eukaryotes	Ch 12: 12.1, 12.2	Tilman
23	W	Oct 26	Gene Regulation in Eukaryotes	Ch 13: 13.4, 13.5	Tilman
24	F	Oct 28	Chromatin	Ch 12: 12.3	Day
25	M	Oct 31	Epigenetics	Ch 12: 12.4-12.7	Day
Evening Exam 2, 7:15-9:15 PM, covering lectures 12-23					
26	W	Nov 2	Mutation	Ch16: 16.1-16.3	Day
27	F	Nov 4	Repair, and Recombination	Ch16: 16.4	Day
Part 3: Genetic Analysis					
28	M	Nov 7	Genetic & Epigenetic Basis of Cancer	Ch16: 16.5	Day
29	W	Nov 9	Chromosome Number	Ch17: 17.1	Day
30	F	Nov 11	Large-scale chromosomal changes	Ch17: 17.2-17.3	Day
31	M	Nov 14	Genomics	Ch14	Day
32	W	Nov 16	Transposable Elements	Ch15	Day
33	F	Nov 18	Model Organisms	Ch10: 10.5	Day

				Ch12: 12.5	
34	M	Nov 21	Genetics Screens	Ch13: 13.3	Day
Evening Exam 3, 7:15-9:15 PM, covering lectures 24-33					
35	W	Nov 23	Developmental Genetics	Ch13: 13.4	Day
Part 4: Population and Quantitative Genetics					
36	M	Nov 28	Quantitative traits: analysis of variance	Ch19: 19.1, 19.2	Day
37	W	Nov 30	Quantitative traits: heritability	Ch19: 19.3, 19.4	Day
38	F	Dec 2	Quantitative Traits: quantitative trait loci	Ch19: 19.5, 19.6	Day
39	M	Dec 5	Population genetics: Hardy Weinberg frequencies,	Ch18: 18.2-18.4	Day
40	W	Dec 7	Population genetics: Extensions to Hardy-Weinberg	Ch18: 18.5	Day
41	F	Dec 9	Population genetics: Inbreeding	Ch18: 18.3	Day
42	M	Dec 12	Population genetics: Selection	Ch18: 18.5	Day
43	W	Dec 14	Population genetics: Equilibrium	Ch18: 18.5	Day
Final, TBA, covering lectures 34-43					