

BIOL 362 **Principles of Genetics, Spring 2012, 4.0 credits**

Date	Lecture topic	Chapter
23 Jan-Mon	Introduction	1
25 Jan-Wed	DNA: The genetic material	2
30 Jan-Mon	DNA replication	3
01 Feb-Wed	Gene function	4
	<i>03 Feb-Fri: Last day for student- and faculty-initiated drops (course does not appear on academic record)</i>	
06 Feb-Mon	Gene expression: Transcription	5
08 Feb-Wed	Gene expression: Translation	6
13 Feb-Mon	DNA mutation, DNA repair, and transposable elements	7
15 Feb-Wed	Genomics: The mapping and sequencing of genomes	8
20 Feb-Mon	Exam 1 (chapters 1 to 7) - Study Questions	
22 Feb-Wed	Functional and comparative genomics	9
27 Feb-Mon	Recombinant DNA technology	10
29 Feb-Wed	Mendelian genetics	11
05 Mar-Mon	Chromosomal basis of inheritance	12
07 Mar-Wed	Extensions of Mendelian genetic principles	13
12 Mar-Mon	Spring break	
14 Mar-Wed	Spring break	
19 Mar-Mon	Non-Mendelian inheritance	13
21 Mar-Wed	Genetic mapping in eukaryotes	14
	<i>23 Mar-Fri: Last day for student- and faculty-initiated drops (W grade given for course)</i>	
26 Mar-Mon	Genetics of bacteria and bacteriophages	15
28 Mar-Wed	Variation in chromosome structure and number	16
02 Apr-Mon	Exam 2 (chapters 8 to 16) - Study Questions	
04 Apr-Wed	Regulation of gene expression in bacteria and bacteriophages	17
09 Apr-Mon	Regulation of gene expression in eukaryotes	18
11 Apr-Wed	Genetic analysis of development	19
16 Apr-Mon	Genetics of cancer	20
18 Apr-Wed	Population genetics 1	21
23 Apr-Mon	Population genetics 2	21
25 Apr-Wed	Quantitative genetics	22
30 Apr-Mon	Molecular Evolution	23
02 May-Wed	Final review session	
09 May-Wed	Exam 3 (chapters 17 to 23) - Study Questions 10:15 AM - 12:15 PM – Elvey Auditorium	

Location and time:

Mon & Wed 11:45 AM - 1:15 PM, Elvey Auditorium - Geophysical Institute

Textbook:

Peter J. Russel. 2010. iGenetics: A Molecular Approach, 3rd edition. Pearson Education, San Francisco, California. ISBN 0-321-56976-8/978-0-321-56976-9

Laboratory notebook:

Provide your own lab notebook and bring it to your first lab.

Web content:

Course web site (UAF): http://users.iab.uaf.edu/~kevin_mccracken/genetics/

iGenetics web site: <http://www.aw-bc.com/geneticsplace/>

Web site includes: iActivities, animations, practice quizzes, glossary, and solutions to end-of-chapter problem sets.

Grading:

Exam 1 20%

Exam 2 25%

Exam 3 25%

Lab grade 20%

Paper* 10%

*One 5-page lab paper (double-spaced). This may be turned in anytime after spring break, but no later than 2 May. Topics should focus on a theme of modern 21st century genetics that is of personal or professional interest. Examples might include an overview of recent technological developments in molecular genetic technology (e.g., next-generation methods of whole genome DNA sequencing, recombinant DNA, gene discovery & isolation etc.); genetics of a particular disease or public health problem; or conservation and evolutionary genetics. These are just some possible topics. Anything is possible, but please confirm your topic with the instructor prior to writing.

*Study questions will be provided online so that you have the opportunity to work through difficult concepts prior to your exams. These will not be graded, but your instructors will discuss these questions and answers during scheduled review sessions.

*3% bonus added to final grade for 100% lecture attendance (attendance will be sampled randomly).

*Exams in this course are purposely designed to be challenging, and it is not uncommon for raw scores to be low (e.g., means of 45-65%)—exam and final grades will be adjusted appropriately based on the overall means for each exam and the final grade distribution.

Exam make-up policy:

Make-up exams are very strongly discouraged. If circumstances are dire or grievous enough that you are unable to take the exam, please contact me by phone (w: 907-474-6419, h: 907-452-2827) or e-mail (kmccrack@iab.alaska.edu) in advance of the exam. Otherwise, no make-up exam will be given and your grade will be zero for that exam. Your make-up exam may be oral!

Incomplete policy:

Incomplete grades are discouraged and will only be authorized under exceptional circumstances. Your performance and participation in the course will factor into this decision.

Student code of conduct:

Students are subject to the UAF [Student Code of Conduct](#). Plagiarism, cheating, and other forms of academic dishonesty will be not tolerated, and will result in immediate failure of the course (not just the assignment). Students that participate in these types of activities will be withdrawn from the course and turned over to the Dean of Student Affairs.

Other policies:

Needs of students with disabilities will be accommodated following university policies. Please talk to the instructor privately if you have questions or require assistance. The [UAF Center for Health and Counseling](#) also provides disability services. Student athletes and members of the U.S. military should coordinate their absences with the instructor in advance.

Contact information:

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Office hours:

Monday 3:30 to 4:30 pm or by appointment.

Lab Syllabus: BIOL 362 Principles of Genetics, Spring 2012

Lab protocols will be provided online. Please download these from the course web site each week before lab.

Week	Lab activity
23 Jan	Introduction Pipette techniques & lab safety Meiosis & mitosis
30 Jan	DNA extraction: QIAGEN protocol & Onion/Banana DNA extraction <i>Set up <i>Drosophila melanogaster</i> bottleneck experiment</i>
06 Feb	Polymerase chain reaction (PCR) DNA replication, transcription, and translation
13 Feb	Review Session for Exam #1 on 20 Feb (chapters 1 to 7)
20 Feb	Electrophoresis & DNA purification <i>Drosophila melanogaster</i> bottleneck experiment - bottleneck 1
27 Feb	DNA cycle-sequencing (meet in WRRB lobby) Tour West Ridge Research Building (WRRB) & IAB Core Facility for Nucleic Acid Research
05 Mar	DNA sequence contig construction & data analysis
12 Mar	Spring break <i>Drosophila melanogaster</i> bottleneck experiment - bottleneck 2 (Your TA will handle the flies while you spring break)
19 Mar	Online Genbank tutorial, Protein Modeling
26 Mar	Review Session for Exam #2 on 02 Apr (chapters 8 to 16) Genetic diseases Lab #1
02 Apr	<i>Drosophila melanogaster</i> bottleneck experiment - bottleneck 3 Tour - UA Museum Facilities
09 Apr	Cloning and gene transformation #1
16 Apr	Cloning and gene transformation #2 Genetic diseases Lab #2 - presentations
23 Apr	<i>Drosophila melanogaster</i> bottleneck experiment - final results Field Trip to Creamer's Field - Migratory Birds
30 Apr	Turn in notebook to TA

Lab make-up policy:

Lab activities flow consecutively from one week to the next; i.e., you will use your DNA extract for PCR, your purified PCR product for cycle-sequencing, and your sequence for contig construction and data analysis, etc. If you miss one step, you miss the next step. Labs should not be missed. Make-ups are at the discretion of your TA, but must be coordinated in advance and completed prior to the next lab. Missed labs will be subtracted from your lab notebook grade (20% of overall grade).

Lab sections (location and time):

F01 Mon 2:15 - 5:15 PM BUNN 408

F02 Tue 2:00 - 5:00 PM BUNN 408

F03 Wed 2:15 - 5:15 PM BUNN 408

TA contact information (office hours by appointment):

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