BIOL 250 **Genetics, Fall 2017, 3.0 credits**

Date	Lecture topic	Textbook chapters	
		Russell*	Klug et al.
22 Aug-Tue	Introduction & syllabus	1	
	DNA: The genetic material	2	10,12
	DNA replication	3	11
	Gene function	4	1
	Gene expression: Transcription	5	13
	Gene expression: Translation	6	14
	DNA mutation & DNA repair	7a	15
14 Sep-Thu	**Review Session for Exam #1**		
21 Sep-Thu	**Exam #1 - Chapters 1 to 7a**		
	Transposable elements	7b	15
	Recombinant DNA technology	8	20
	PCR, DNA sequencing, and single nucleotide polymorphisms (SNPs)	9a	20,22
	DNA fingerprinting with microsatellites, restriction fragment length polymorphisms (RFLPs), & Southern/Northern blots	9b	20,22
	Genome-wide association studies & chromosome walking	10a	21
	Shotgun genome sequencing & functional genomics	10b	21
	Mendelian genetics	11	3
	Chromosomal basis of inheritance	12	2,7
	Extensions of Mendelian genetic principles	13a	4
	Non-Mendelian inheritance	13b	9
19 Oct-Thu	**Review Session for Exam #2**		
26 Oct-Thu	**Exam #2 - Chapters 7b to 13**		
	Genetic mapping in eukaryotes	14	5
	Genetics of bacteria and bacteriophages	15	6
	Variation in chromosome structure and number	16	8
	Regulation of gene expression in bacteria and bacteriophages	17	16
	Regulation of gene expression in eukaryotes	18	17
	Genetic analysis of development	19	18
	Genetics of cancer	20	19
	Population genetics 1	21a	25
	Population genetics 2	21b	25
	Quantitative genetics	22	23
	Molecular Evolution	23	25
07 Dec-Thu	**Review Session for Exam #3**		
12 Dec-Tue	**Exam #3 (chapters 14–23) 5:00-7:30 PM**		

*Exam dates are approximate target dates, may be moved back by week if necessary.

Location and time:

Tuesday & Thursday 2:00 – 3:15 PM, Cox Science 126

Thursday 7:50 – 9:05 PM, Cox 126 (3rd class time for review sessions, make-up lectures, & exams TBA by the professor)

Prerequisites:

BIL 150 (General Biology) and 160 (Evolution & Biodiversity). BIL 151 or 152 or 153 (General Biology Laboratory). BIL 161 or 162 (Evolution & Biodiversity Laboratory). Prerequisites may be waived with instructor and departmental approval.

Student learning objectives:

This is a broad survey of the entire field of genetics ranging from classical studies of chromosomal inheritance to the most recent advances in the field of genomics. Students completing the course will achieve a comprehensive, detailed understanding of the basis of heredity, molecular methodology and mechanisms, biotechnology, population genetics, genome evolution, developmental genetics, and societal issues pertaining to medical ethics and the environment.

Textbooks (optional):

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 (this is the original text that many of the lecture slides were made from using the publisher's graphics).

Klug, W.S., M.R. Cummings, C.A. Spencer, M.A. Palladino. 2012. Concepts of Genetics, 11th edition. Pearson. ISBN 978-032-194891-5 (this is an excellent text that other genetics professors currently use at UM).

I encourage you to select one of the texts and read the relevant chapter prior to each lecture. Which text you select is not so important. While I follow the sequence from the Russell text, the content is mostly my own, and my exams are mostly based on my lectures.

App for your phone:

We will be using an app on your smart phone that works with a program called *Learning Catalytics* (Pearson) to take non-graded quizzes, which will also serve the purpose to taking attendance. The approximate cost for the semester is about $12 (details to follow).

Important dates:

06 September - Last day to drop a course without a W
23 October - Last day to drop a course (W grade given for course)
12-15 October - Fall recess (no class 12th)
18-26 November - Thanksgiving recess (no class 21st & 23rd)
05 December - Last day of class
12 December - Final Exam 5:00 to 7:30 PM Tuesday

Web content:

Course web site: http://www.bio.miami.edu/mccracken/genetics/

iGenetics web site: https://media.pearsoncmg.com/bc/abp/geneticsplace/
Subscription to web site includes: iActivities, animations, practice quizzes, glossary, and solutions to end-of-chapter problem sets.

Concepts of Genetics, 11th edition: http://www.mypearsonstore.com/bookstore/concepts-of-genetics-0321948912

NCBI - National Center for Biotechnology Information (NIH): https://www.ncbi.nlm.nih.gov/

PLoS Genetics - a top genetics journal: http://journals.plos.org/plosgenetics/

Genetics: http://www.genetics.org/

American Journal of Human Genetics: http://www.cell.com/ajhg/home

Grading:

You MUST take all 3 exams and complete the 1 required paper to receive a passing grade.

Exam 1	30%
Exam 2	30%
Exam 3	30%
Paper (mandatory)	P/F
Attendance	10%

Students with a final rank in the highest 40 percentile will earn a minimum grade of A

Students with a final rank in the following 50 percentile will earn a minimum grade of B

Students with a final rank in lowest 10 percentile will earn a minimum grade of C

Your attendance will determine 10% of your grade (two unexcused absences are allowed; in addition to these, religious, U.S. military, and student athletics and other excuses such as med school interviews are allowed, please be inform me). Attendance will be taken electronically with non-graded quizzes using a smart phone app (or you can elect to sign an attendance sheet).

If you do not take all of the required exams or do not turn in the required paper, you may receive a failing grade (F), or receive an incomplete (I) depending on the circumstances. Each of these cases will be looked at specifically as to whether you can complete the work and have tried to do so diligently and timely. For example, if you do not turn in your paper by the deadline, I might remind you that it is required and insist that you complete it before I issue a grade.

I reserve the option to give positive (+) grades at my discretion to a contiguous set of top-performing students in upper quantiles (e.g., 10%) of the A and B category. I do not give minus (-) grades for "A" or "B" but reserve the option to assign a "B-" in place of a "C" grade. There are no D grades.

No writing credit is available for this course (there is not enough writing/revision + too many students and unfortunately no TA support from the College of Arts & Sciences).

Availability of grades:

Exam grades (%) will be posted on my lab window (Cox #188) following each exam. I will indicate the 40/50/10% breakpoints for A/B/C and also post a running average for the 2nd and 3rd exam. I am a bit old fashioned, I don't use Blackboard.

Details of the required paper:

One 5-page (double-spaced) paper. This may be turned in anytime after fall recess, but no later than the last day of class on 5 December 2017. 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; developmental genetics; or conservation and evolutionary genetics. These are just some possible topics. Any interesting topic is possible, but please confirm and/or discuss your topic with the instructor or TA prior to writing.

Review sessions and study questions:
Example study questions will be provided on the web site 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.

The review sessions and exams generally will take place during the Thursday slot at 7:50 – 9:05 PM (Cox 126). Sometimes exams are postponed by a week. You will have at least two weeks notice.

Occasionally, I will use the Thursday night review session to make up a lecture if I have to cancel a Tuesday or Thursday lecture to go to a conference or field trip.

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 55-65%), but remember your final letter grade is based on your percentile not your raw score or some arbitrary cutoff.

Exam make-up policy:
Make-up exams are not generally given. If circumstances are such that you are unable to take the exam, please contact me by personal e-mail (kevin.g.mccracken@gmail.com) in advance of the exam. Otherwise, no make-up exam could be given and your grade will be zero for that exam.

Incomplete policy:
Incomplete (I) grades are discouraged and will only be authorized under exceptional circumstances. Your performance and participation in the course will factor into this decision. I will require you to complete all exams and the mandatory paper before a grade can be issued.

Student code of conduct:
Students are subject to the UM Student Honor Code. Plagiarism, cheating, and other forms of academic dishonesty will not be tolerated. All cases in which students participate or appear to participate in these types of activities will be referred to the UM Honor Council, Dean of Students. Finding of a violation by the UM Honor Council will result in failure of the course (not just the assignment).

Civil rights and disability protections:
The University of Miami does not discriminate on the basis of race, color, creed, national origin, religion, age, sex, sexual orientation, gender identity, veteran status, physical or mental disability, marital status, changes in marital status, pregnancy or parenthood, or genetic information. The University of Miami strictly prohibits retaliation for opposing discriminatory practices by all its personnel. This policy affects employment policies and actions, as well as the delivery of educational services at all levels and facilities of the university.

Needs of students with disabilities will be accommodated in a confidential and respectful manner following university and federal policies pertaining to ADA accessibility with efforts to make all possible reasonable accommodations. Please talk to the instructor if you require any special assistance. The Office of Disability Services in the Academic Resource Center, N201, Whitten University Center provides disability services; 305-284-2374 (Voice), 305-284-3401 (TDD).

Contact information:

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Office hours:
Tuesday & Thursday before and after class or by appointment.