FLORIDA ATLANTIC UNIVERSITY™

Undergraduate Programs—COURSE CHANGE REQUEST[1]

UUPC APPROVAL _____
UFS APPROVAL _____
SCNS SUBMITTAL _____
CONFIRMED _____
BANNER POSTED _____
CATALOG _____

DEPARTMENT: BIOLOGICAL SCIENCE

COLLEGE: COLLEGE OF SCIENCE

COURSE PREFIX AND NUMBER: PCB 3063

CURRENT COURSE TITLE: GENETICS

CHANGE(S) ARE TO BE EFFECTIVE (LIST TERM): FALL 2013

____ TERMINATE COURSE (LIST FINAL ACTIVE TERM):

CHANGE TITLE TO:

CHANGE PREFIX FROM: **TO:**

CHANGE COURSE NO. FROM: **TO:**

CHANGE CREDITS[2] FROM: **TO:**

CHANGE GRADING FROM: **TO:**

CHANGE WAC/GORDON RULE STATUS[3]
ADD*_____ REMOVE _____

CHANGE GENERAL EDUCATION REQUIREMENTS[4]
ADD*_____ REMOVE _____

*WAC and General Education criteria must be clearly indicated in attached syllabus. For WAC Guidelines: *www.fau.edu/WAC*. Please attach General Education Course Approval Request: *www.fau.edu/deanugstudies/GeneralEdCourseApprovalRequests.php*

CHANGE DESCRIPTION TO:

CHANGE PREREQUISITES/MINIMUM GRADES TO*:

EXISTING
BSC 1010, BSC 1010L, BSC 1011, BSC 1011L

NEW PRE/REQ.
BSC 1010, BSC 1010L, BSC 1011, BSC 1011L, CHM 2045, CHM 2045L, CHM 2046, CHM 2046L

MINIMUM PASSING GRADE C-

EXISTING COREQUISITES:

CHANGE COREQUISITES TO*:

CHANGE REGISTRATION CONTROLS TO:

*Please list existing and new pre/corequisites, specify AND or OR and

Attach syllabus for **ANY** changes to current course information.

Should the requested change(s) cause this course to overlap any other FAU courses, please list them here.

Please consult and list departments that might be affected by the change(s) and attach comments.[5]

Faculty contact, email and complete phone number:
David Binninger; binninge@fau.edu; 561.297-3323

Approved by:	*Date:*
Department Chair:	Feb. 27, 2013
College Curriculum Chair:	3/21/13
College Dean:	3/26/13
UUPC Chair:	3/22/13
Undergraduate Studies Dean:	3/27/13
UFS President:	
Provost:	

1. **Syllabus** must be attached; syllabus checklist recommended; see guidelines and checklist: *www.fau.edu/academic/registrar/UUPCinfo*
2. Review **Provost Memorandum: Definition of a Credit Hour** *www.fau.edu/provost/files/Definition_Credit_Hour_Memo_2012.pdf*
3. **WAC approval** (attach if necessary)
4. **Gen. Ed. approval** (attach if necessary)
5. **Consent** from affected departments (attach if necessary)

Genetics, PCB 3063 001 Fall 2013

CRN 13585, 4cr.

Prerequisites: BSC 1010, 1010L, 1011, 1011L,CHM 2045,CHM 2045L,CHM 2046,CHM 2046L with a Minimum grade of C-

Instructor: Dr. Colin R. Hughes
office: DW439, lab: DW440
off. ph: 954 236 1156 lab ph: 954 236 1143
email colin.hughes@fau.edu

T.A.: Jason Bosley Office: DW333
email jbosley2@fau.edu

Class meets: 2:00 pm – 3:50 pm, Tuesday and Thursday, in LA 120

Office Hours: M, W, F, 9 'til 11, and by arrangement. I will make every effort to adhere to the chosen times but I anticipate not always being in my office at those times so please call ahead, or email me to ensure we can meet. During the work-week, I will make every effort to respond to emails within one day. Over the weekends, I will respond within two days.

Jason, our T.A., will be available to discuss assigned problems, old test questions, and so on; he will hold office hours in room DW333 before class from 12-2 on Tuesdays, and from 8 to 10 AM on Wednesdays.

Required text: Genetics, a conceptual approach, 4th edition. Pierce. Assigned reading from this book is outlined in the 'schedule' found at the end of this syllabus.

Course objectives: to guide you to a thorough understanding of the transmission of genetic information across generations, to introduce you to a number of aspects of modern molecular genetics, and to enable you to apply your knowledge and understanding to solve problems. I also hope to interest you in the vigorous genetic research going on today, and the application of these studies to everyday problems. Material comprising this course is important in the future of all who will work in biology, biotechnology, or medicine, and all those who want to keep abreast of modern society. Therefore I hope to inspire you to pay attention to future developments and applications of genetics.

Instruction: all the material you need to know is presented in the text. The text is well organized, beautifully illustrated, and well written. I will assign material to be read, but it will be clear what you should read, from what is discussed in class.

In lecture, I will not be a "textbook wired for sound". Rather, during the class periods, I will lecture, and pose problems with the goals of heightening your interest,

guiding you toward different ways of learning and understanding, and emphasizing the most important facts and explanations. Therefore, lectures do not cover all the material you should master; I rely on you reading the textbook for that.

This subject is amenable to problem-based learning and I expect a lot of discussions based on problems. To make this work well, I expect you to have a positive attitude, be on time, be prepared, and be respectful of other people in class. I will also use iClickers, and short, written, in-class assessments.

This course will be administered through Blackboard. This means that you will need regular access to a computer able to access the Web, and you will need some facility with the program Blackboard itself. The program is fairly intuitive, it contains lots of helpful information that pops up when needed, and is readily learned by clicking on all the buttons to see what happens.

While in class, please be respectful of your fellow students. I strongly urge you to turn electronic devices to silent mode, and put them in your bag. Remember, if you are paging through messages, texting, or surfing the web, others will be distracted from lecture too. This is not just a cost to your learning, but to fellow students.

Learning outcomes: after you have successfully completed this course, I expect that you will know, and be able to do the following:

Name some of the pioneers of genetics, and outline their roles in the development this field.
List similarities and differences between prokaryotes and eukaryotes then explain how what these comparisons imply for the genetics of these organisms.
Clearly state the consequences of mitotic cell division, and explain how a cell changes from one part of the cell cycle to another.
Relate the process of mitosis to its function.
Describe the steps of meiotic cell division, and how these relate to the product of meiosis.
Clearly state how mutation, independent assortment, and crossing over, generate genetic variation.
Relate meiosis to the inheritance of alleles.
Predict the outcome of controlled genetic crosses involving a single trait, and infer the genotypes of parents that produced a particular outcome.
Similarly you will be able to predict the outcome of crosses involving two traits, and also infer the genotypes of parents that produced a particular ratio of offspring.
Be familiar with the Chi square test, which can be used to determine whether ratios of offspring are similar to, or differ from, ‘Mendelian ratios’.
Be able to describe a number of different ways in which sex is determined in organisms, beyond the familiar X Y system of humans.
Predict the outcome of controlled genetic crosses that involve a trait encoded on a sex chromosome. Alternatively, you will be able to infer that a trait was encoded on a sex chromosome, and the genotypes of the parents, from offspring ratios.
Be able to explain why anomalous numbers of sex chromosomes in humans have rather little effect on phenotype.

Be able to predict the outcomes, or infer parents, of crosses involving traits that do not show the simple dominance of the original traits studied by Mendel.
Be able to explain how factors beyond the single locus can alter the outcomes of crosses.
Be able to explain how the inheritance of human characteristics can be inferred from pedigree and twin data, and use pedigrees to infer the mode of inheritance.
Be able to predict the outcome of crosses involving two traits located on a single chromosome, and use offspring ratios to calculate the map distance between the two genes.
Describe how rearrangements of the genetic material affect the outcomes of genetic crosses.
Be able to explain how to study the inheritance of traits in Bacteria.
Grasp the grand-scale structure of the genome and be able to deduce how changes in that structure affect genotype and phenotype.
Develop an accurate mental image of the structure of DNA, and what this means for its ability to code information.
Be able to describe the categories of DNA sequence that in combination comprise the genome.
Be able to visualize how DNA is accurately copied into DNA.
Be able to visualize how DNA is accurately transcribed into RNA.
Be able to distinguish RNA from DNA, both in structure and function.
Explain how RNA is involved in making useful molecules based on the information in DNA.
Be able to use examples to explain how the correct quantity of these useful molecules is produced.
Develop an accurate and reasonable view of the term 'mutation'.
Be able to name specific physical, chemical, and spontaneous causes of mutation.
Understand how cells can correct certain mutations through direct repair, base-excision repair, nucleotide excision repair, and mismatch repair.
Predict how chemical modification of bases that causes mispairing cause particular kinds of substitution mutations.
Be able to use your basic knowledge of genetics to explain how the fundamental techniques of Biotechnology work, especially cloning, pcr, and DNA sequencing.
Propose ways that genetic technology can be harnessed to improve medical treatments and agriculture.
Through all of this you will become able to use the specialized vocabulary of genetics.

Course schedule: Material will be presented in the same order as in the text. At the end of the syllabus you will find a 'schedule': a table that lists the order of the material. This is a tentative schedule; if I feel more time is needed on a particular subject then we will progress a little slower than this schedule suggests.

In the right-hand column, the schedule lists the reading material assigned for each week, this also covers the problem sets at the back of each chapter. I expect you to spend at least eight hours outside of class time on reading and problem solving. Assigned reading is on average 5pp per day, please keep current on the reading, since it is otherwise a mountain of material to read before a test. Remember, there is a huge difference between being familiar with the text, and really understanding it. Even though

it is written clearly and simply, it takes concentrated thinking to understand the text. In addition, you should do as many problems from the back of the chapter as necessary; you can recognize when you have mastered the material because you will be able to see how to figure out the answer to the problems, explain it to study mates, and justify your answer. If you don't understand any of the readings or problems, Jason or I would be happy to sit down and help explain.

Study approaches: Genetics is a class where understanding is much more important than memorization; however, there is an enormous number of new words and facts that must be mastered before problems can be solved. Here is one strategy to help you with that:

Make a series of cards, word or phrase on one side, plain English definition on other. Build this deck of cards over the semester, adding new ones after each lecture. Alone or with buddy, test whether you can explain in plain English what a word means, and alternatively, what the technical word is for a particular process/structure.

To make this more challenging, and help your learning even more, pull two cards at random and explain to self or buddy, in plain English, what the relationship between them is. Write a simple sentence that uses both words. Also, pull related cards, and draw a concept map that connects them.

Since genetics is often centered on problem solving, doing the questions at the end of each chapter is very helpful. I will also post old tests so you can see the kinds of problems that will appear on exams. Since it is the doing of the problems that is important, not learning the answers, I will not post the correct answers. When you are sure you have arrived at the correct answer, you will be sure you have studied that material enough.

Be careful, when you are studying, not to mistake familiarity with the material for understanding. Good indications that you understand are than you can use the information to solve problems, you can explain why your answer is correct, you can explain a point to another person, you can draw a concept map to relate different facts or ideas, and you can write proper sentences using the vocabulary of genetics.

Examinations and grading. There will be four tests and a comprehensive final. Tests will cover material emphasized in class, and all material from the text that has been assigned as reading (see table below), unless I have explicitly excluded it. All of these will be largely multiple-choice format; mid-terms ('tests') will have 25 questions and the final will have 50 questions. I expect that tests will have 15 multiple-choice question and 10 'short problems'. The final will be all multiple choice. The iClicker questions will be worth a maximum of 10 points, and the other in-class assessments an additional 10 points. There will be no extra credit work.

Students who wish to be excused from coursework, class activities or examinations so they can participate in religious observation, must notify the instructor in advance of the event, and request an excused absence.

Make-up exams will only be given for medical and other serious, uncontrollable, events, or for the religious observation mentioned above. The make-up exams will be short answer format, and administered by Testing Services in room LA244A: 954 236 1220.

FAU, and I, expect complete academic integrity of our students. Academic dishonesty interferes with our goal of providing a high quality education in which no student is enjoys an unfair advantage over any other. It also corrodes the mutual trust among members of the university community. Therefore academic dishonesty is subject to harsh penalties. Please see the details in the Undergraduate Catalog, Students Handbook, and University Regulation 4.001.
http://www.fau.edu/ctl/4.001_Code_of_Academic_Integrity.pdf

Test scores will be posted on Blackboard

Grading will be based on the cumulative sum of all tests and in-class responses. Grades will then be determined from the accumulated score:

		93% or more	A	90-92%	A-
87-89%	B+	83-86%	B	80-82%	B-
77-79%	C+	73-76%	C	70-72%	C-
67-69%	D+	60-76%	D		
		less than 60%	F		

'Incomplete' grades are given at FAU only to: a student who is passing a course but has not completed all the required work because of exceptional circumstances. In such a case the student, may, with the approval of the instructor, temporarily receive a grade of I (**Incomplete**). The grade of I indicates a grade deferral and must be changed to a grade other than I within a specified time frame, not to exceed 1 calendar year from the end of the semester during which the course was taken. The I grade is used only when a student has not completed some portion of the work assigned to all students as a regular part of the course. It is not to be used to allow students to do extra work subsequently in order to raise the grade earned during the regular term. The instructor is required to record on the appropriate form, and file with the Registrar, the work that must be completed for a final grade, the time frame for completion, and the grade that will be assigned if work is not completed. It is the student's responsibility to make arrangements with the instructor for the timely completion of this work.

Students who need reasonable accommodations due to a disability that interferes with their performance, must register with the Office for Students with Disabilities (OSD) to get any such accommodations. In Boca, this office is in SU133 (561 297 3880), in Davie it is in LA240 (954 236 1222), in Jupiter SR110 (561 799 8010), and in Treasure Coast CO117 (772 873 3441). Students are asked to follow procedures explained by the OSD; they are really helpful.

Schedule for Genetics, PCB 3063, Spring 2013

	Topics	Reading assignment
8 January	Introduction, and overview.	Chapter 1
10	Cell division to increase cell number	Ch 2
15	Cell division to make gametes	Ch 2
17	Inheritance of single, simple traits alone, and together.	Ch 3
22	Inheritance of traits on sex chromosomes.	Ch 4
24	Inheritance of not-so-simple traits.	Ch 5
29	Studying inheritance of traits in humans.	Ch 6
31	Inheritance of traits on the same chromosome.	Ch 7
5 February	Q & A session then Test 1	Ch 8
7	Bacterial genetics	
12	Rearrangement and change in amount of DNA	Ch 9
14	Molecular nature of DNA and RNA	Ch 10
19	Organization of DNA in chromosomes, function of DNA	Ch 11
21	Replication and recombination of DNA	Ch 12
26	Transcription of DNA	Ch 13
28	Q & A then Test 2 (last day to drop 1 March)	
12 March	Modifying RNA, uses of RNA	Ch 14
14	Translating RNA into protein	Ch 15
19	How prokaryotes control gene expression.	Ch 16
21	How eukaryotes control gene expression.	Ch 17
26	Damage and repair of DNA	Ch 18
28	Q & A then Test 3	
2 April	Molecular genetic analyses	Ch 19
4	Applications of molecular genetics.	Ch 19
9	Genome level analyses.	Ch 20
11	Genetics of development, and immunity.	Ch 22
16	Cancer genetics.	Ch 23
18	Quantitative genetics.	Ch 24
23	Q & A, then Test 4	Ch 25
30 April	Comprehensive Final 1:15 – 3:45	in LA 120