

Molecular Biology and Genetics

BIOL 202, Summer Session II: 2011

Class Information:

Lecture: M-F, 9:45-11:15 a.m., Wilson Hall 107

Recitations: MTTh 12:00-12:50 p.m. (601) or 1:00-1:50 p.m. (602), Wilson Hall 213

Instructor:

Dr. Tonya Laakko Train

Office: Wilson Hall 210

Contact: ttrain@elon.edu

Office Hours: Wednesday and Friday 11 :15- 12 :45 and by appointment

Recitation Instructor:

Nick Garcia

Contact: nwgarcia@email.unc.edu

Course Description: This course will introduce students to the fundamentals of genetics and molecular biology. We will investigate how genes result in traits, how genetic material is transmitted and recombined and the biological consequences of major chromosomal abnormalities. In addition, students will learn the molecular processes of DNA replication, transcription, translation, gene expression and mutation. There will also be an introduction to current molecular techniques and current and future advances in the field.

Course Goals The successful student will have achieved the following goals upon completion of this course:

- Will have gained a fundamental understanding of the transmission of genetic material
- Will understand the process and result of recombination of genetic material
- Will know how to determine phenotypic outcomes of single and multiple gene crosses
- Will have a solid understanding of the molecular basis of genetic information and gene expression
- Will understand the molecular basis and phenotypic outcomes of genetic mutations
- Will be able to relate genetic concepts to real-life situations
- Will understand and know the molecules involved in replication, transcription and translation of genetic material

Required Text:

Introduction to Genetic Analysis, 9th Edition, W.H. Freeman & Co.

by Griffiths, Wessler, Lewontin, and Carroll

Web-based bioinformatics tutorials, animations, and other supplemental information can be found at <http://bcs.whfreeman.com/iga9e/>

Additional Requirements:

- Prerequisites are a grade of C or higher in BIOL 101 and CHEM 101 or CHEM 102
- Students will be required to utilize Blackboard™ (Bb)/Connect Carolinas to obtain assignments and other information.
- You must be accessible at the email address listed in Bb/Connect Carolinas.
- You must bring a calculator (cell phones may not be used as calculators) to each exam.

Course Policies:

- **Attendance-** It is to your benefit to attend each lecture and recitation session. This course will move quickly and cover a lot of material. If you fall behind it will be a significant disadvantage. With that said, there is no formal penalty for absences but attendance will be documented. *Absences from recitation will result in a forfeit of any points earned during that session (including homework problems).*
- **Missed Exams-** You may NOT make-up missed exams. The rare exception to this policy is in the case of a University-approved absence or a documented emergency.
- **Integrity-** Lying, cheating or stealing will not be tolerated. During examinations, the only electronic device that might be allowed is a calculator. All other electronics must be stowed. During class, texting, twittering, Facebooking... is disrespectful, please refrain from e-communicating.

You are bound by the University Honor Code. The following statement was provided by the office of the Vice Chancellor and Provost and applies and is the policy for this course: *"All work done in this class must be carried out within the letter and spirit of the UNC Honor Code. You must sign a pledge on all graded work certifying that no unauthorized assistance has been given or received. You are expected to maintain the confidentiality of examinations by divulging no information about any examination to a student who has not yet taken that exam. You are also responsible for consulting with your professors if you are unclear about the meaning of plagiarism or about whether any particular act on your part constitutes plagiarism. Please talk with the professor or your T.A. if you have any questions about how the Honor Code pertains to this course."*

Special Needs: Please contact an instructor as soon as possible to discuss any documented special needs. We will do everything possible to make accommodations for your success in this class. The website for the Academic Success Program for Students with Learning Disabilities can be found at <http://www.unc.edu/depts/lds/>.

Grading:	Point distribution	Percent of grade
Semester exams (100 points each)	300 points	60 %
Final Exam (cumulative)	150 points	30 %
Recitation (homework/participation)	50 points	10 %

The grading scale is as follows:

A	93-100%	C+	77-79.9	D-	60-62.9
A-	90-92.9	C	73-76.9	F	<60
B+	87-89.9	C-	70-72.9		
B	83-86.9	D+	67-69.9		
B-	80-82.9	D	63-66.9		

UNC defines their grades as follows:

"A - Mastery of course content at the highest level of attainment that can reasonably be expected of students at a given stage of development. The A grade states clearly that the student has shown such outstanding promise in the aspect of the discipline under study that he/she may be strongly encouraged to continue.

B - Strong performance demonstrating a high level of attainment for a student at a given stage of development. The B grade states that the student has shown solid promise in the aspect of the discipline under study.

C - A totally acceptable performance demonstrating an adequate level of attainment for a student at a given stage of development. The C grade states that, while not yet showing any unusual promise, the student may continue to study in the discipline with reasonable hope of intellectual development.

D - A marginal performance in the required exercises demonstrating a minimal passing level of attainment for a student at a given stage of development. The D grade states that the student has given no evidence of prospective growth in the discipline; an accumulation of D grades should be taken to mean that the student would be well advised not to continue in the academic field.

F - For whatever reasons, an unacceptable performance. The F grade indicates that the student's performance in the required exercises has revealed almost no understanding of the course content. A grade of F should warrant an adviser's questioning whether the student may suitably register for further study in the discipline before remedial work is undertaken."

Exams: Semester exams will utilize a variety of question formats. There will be true/false, multiple choice, fill-ins, problems and short answer questions.

Final Exam: The final exam will be cumulative and will consist of true/false, multiple choice, short answer and problems.

Recitation: The grade for the recitation portion of this course will be comprised of graded assigned problems and in-class group work.

Lecture Outline –

Dr. Train reserve the right to make modifications as necessary

Date	Topic	Reading
Thurs 06/16	Course Introduction and What are Genes, Genetics and Traits?	Ch. 1 pp. 1-13; 21-24; Ch 2 pp. 54-55
Fri 06/17	Inheritance: <i>Review of Mitosis and Meiosis, Single gene crosses</i>	Ch. 2 pp. 37-61
Mon 06/20	Inheritance: <i>X-linked inheritance and pedigrees</i>	Ch. 2 pp. 61-76
Tues 06/21	Inheritance: <i>Independent Assortment of Two Genes</i>	Ch. 3 pp. 89-106
Wed 06/22	Genetic recombination: <i>Recombination, Linkage, Mapping</i>	Ch. 3 pp. 106-109 Ch. 4 pp. 129-140
Thurs 06/23	Genetic Recombination: <i>Recombination, Linkage, Mapping</i>	Ch. 4 pp. 140-143
Fri 06/24	Exam 1	
Mon 06/27	Gene Interaction	Ch. 6 pp. 221-230 pp. 235-249
Tues 06/28	Mutation: <i>Major Chromosomal Abnormalities</i>	Ch. 16 pp. 555-586
Wed 06/29	TBA and review of Genetics	TBA
Thurs 06/30	DNA as genetic material	Ch 1, section 1.2, Ch 2, section 2.1, Ch 7, intro, sections 7.1-7.3
Fri 07/01	DNA replication	Ch 7, sections 7.4-7.7
Mon 07/04	HOLIDAY	
Tues 07/05	DNA transcription and RNA processing	Ch 8, intro, sections 8.1- 8.4
Wed 07/06	Exam 2	

Thurs 07/07	Protein synthesis	Ch 9, intro, sections 9.1-9.6
Fri 07/08	Protein synthesis	Ch 9, intro, sections 9.1-9.6
Mon 07/11	Prokaryotic regulation of gene transcription	Ch 10, intro, sections 10.1-10.3
Tues 07/12	Eukaryotic regulation of gene transcription	Ch 11, intro, sections 11.1-11.4
Wed 07/13	Mutations	Ch 15, intro, sections 15.1-15.3, 15.6
Thurs 07/14	Recombinant DNA technology	Ch 20, intro, sections 20.1-20.2, 20.3, 20.6
Fri 07/15	Exam 3	
Mon 07/18	Current Issues in Genetics and Molecular Biology	TBA
Tues 07/19	Current Issues in Genetics and Molecular Biology	TBA
Thurs 07/21	Final Exam 8-11 a.m.	

RECITATION ASSIGNMENTS

The following are homework assignments to be turned in and reviewed in recitation. Solving chapter problems might be your best out-of-class tool for comprehending the material covered in lecture. Please note that the problems assigned are subject to change.

Day	Date	Problem Assignment
Th	6/16	Introductions, expectations, Ch 1: 1, 2, 17, 18, 20, 22
M	6/20	Ch. 2: 14, 16, 17, 20, 22, 26, 32, 34, 46, 63
T	6/21	Ch. 2: 37, 42, 44, 47, 48, 49, 57, 64
Th	6/22	Ch 3: 1 acd, 2, 14 ab, 16, 18; Ch. 4: 3, 6, 7, 12 ab, 48
M	6/27	Ch 6: 8, 12, 16, 21, 27, 49, 51, 52
T	6/28	Ch 16: 1, 3, 11, 12, 13, 16, 19, 23, 26, 28, 32, 35
Th	6/30	Ch 7: 1, 2, 6, 11, 16; 17-20
M	7/04	Holiday
T	7/05	Ch 7: 3-5; 7-10; 12-14; 21; 22-25; 27, 28
Th	7/07	Ch 8: 1-4; 6-9; 10-18
M	7/11	Ch 9: 1-7; 9-11; 14, 15; 17; 19-24
T	7/12	Ch 10: Solved problems; 1-6, 9; 11-13
Th	7/14	Ch 11: 1-5; 14, 15; 17-19; 22
M	7/18	Ch 15: 1-9, 16, 19, 26; 29-30 ; Ch 20: 4, 5; 8-11; 13, 18, 19
T	7/19	Review Day