BIOL 5312: ADVANCED GENETICS

Fall 2009

Name: Dr. Esther Betrán

Office Number: Room B15 Life Science Bldg.

Office Telephone Number: 817-272-1446

Email Address: betran@uta.edu

Office Hours: Tuesdays and Thursdays 2:00 – 3:00 pm

Course Number, Section Number, and Course Title: BIOL 5312 – 001 Advanced Genetics

Time and Place of Class Meetings: Life Science Building, Room LS121, Tuesdays and Thursdays from 12:30 pm to 1:50 pm

Description of Course Content:
In this course, we will focus on understanding how biological information is store, expressed, changed, and transmitted. We will study the genetic principles and concepts, how the information can be manipulated to understand its function, new genetic tools and model organisms. The course will mainly consist of lectures and problem sets that you will have to solve and return. In addition every student will prepare an essay on a genetics topic of his/her interest and present it in class. A few seminal and relevant scientific papers will be read and commented on in class.
Genetics is what is distinctive of a living organism. Organism carry codified information that controls their development, physiology and, ultimately, a big portion of their phenotype. This information is copied, changed, transmitted generation after generation and subject to the evolutionary forces (natural selection and others). Genetic information is codified at the molecular level but its quality has effect at cellular, organism, population and ecosystem levels. This makes Genetics so general that interacts with every other discipline in Biology. In addition the relation of Genetics and disease and of Genetics and Evolution impact human thinking and life.

Student Learning Outcomes:
I hope to cover most of the text book that finishes with a look to some genetic model organisms. We will cover approximately a chapter a week and have time for discussions and essay presentations through the course. The student will learn this material and present a scientific essay before or during the Final Review Week.

Requirements:
There are no prerequisites but consent of the instructor

Required Textbooks and Other Course Materials:

Required Text

Genetics: From Genes to Genomes by Leland Hartwell, Leroy Hood, Michael L. Goldberg, Lee M. Silver, Ruth C. Veres, Ann Reynolds. McGraw-Hill 2nd edition (2004)

Other texts used:

Principles of Genetics by D. Peter Snustad, Michael J. Simmons. Wiley Text Books; 3rd edition (2002)
Concepts of Genetics by William S. Klug, Michael R. Cummings. Prentice Hall; 7th edition (2002)
An Introduction to Genetic Analysis by Anthony J. F. Griffiths, Jeffrey H. Miller, David T. Suzuki, Richard C. Lewontin, William M. Gelbart. W H Freeman & Co.; 7th edition (2000)
Genes VIII by Benjamin Lewin. Prentice Hall; 8th edition (2003)
Human Genetics: Concepts and Applications by Ricki Lewis. McGraw Hill College Div; 5th edition (2003)
Modern Genetic Analysis: Integrating Genes and Genomes by Anthony J. F. Griffiths, William M. Gelbart, Richard C. Lewontin, Jeffrey H. Miller. W H Freeman & Co.; 2nd edition (2002)
Molecular Biology of the Gene, Fifth Edition by James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine, Richard Losick. Benjamin/Cummings; 5th edition (2003)

Descriptions of major assignments and examinations with due dates:

There will be a midterm exam and a comprehensive final exam.

Grading Policy

Problem sets	20%
Essay and presentation	20%
Midterm	30%
Comprehensive final exam	30%

Grading Scale

90-100%	A
80-89%	B
70-79%	C
60-69%	D
0-59%	F

Make-up Exam Policy:
I would not allow make-up exams unless there is a documented case of extreme circumstance. Students who find they are unable to attend an exam should inform me as soon as possible.

Attendance Policy:
Attendance to the lectures is strongly recommended.

Drop Policy:
The last day to drop with an automatic W is October 31 2008. After that date, a student dropping the class will receive a grade of F.

Tentative Course Plan:

Chapters:

1. Genetics: The Study of Biological Information

Part 1 Basic Principles: How Traits Are Transmitted

2. Mendel's Breakthrough: Patterns, Particles, and Principles of Heredity

3. Extensions to Mendel: Complexities in Relating Genotype to Phenotype

4. The Chromosome Theory of Inheritance

5. Linkage, Recombination, and the Mapping of Genes on Chromosomes

Part 2 What Genes Are and What They Do

6. DNA: How the Molecule of Heredity Carries, Replicates, and Recombines Information

7. Anatomy and Function of a Gene: Dissection Through Mutation

8. Gene Expression: The Flow of Genetic Information from DNA via RNA to Protein

Part 3 Genomes

9. Deconstructing the Genome: DNA at High Resolution

10. Reconstructing the Genome Through Genetic and Molecular Analysis

11. The Direct Detection of Genotype Distinguishes Individual Genomes

Part 4 How Genes Travel

12. The Eukaryotic Chromosome: An Organelle for Packaging and Managing DNA

13. Chromosomal Rearrangements and Changes in Chromosome Number Reshape Eukaryotic Genomes

14. The Prokaryotic Chromosome: Genetic Analysis in Bacteria

15. The Chromosomes of Organelles Outside the Nucleus Exhibit Non-Mendelian Patterns of Inheritance

Part 5 How Genes Are Regulated

16. Gene Regulation in Prokaryotes

17. Gene Regulation in Eukaryotes

Part 6 Model organisms

Important University policies:

Americans With Disabilities Act:
The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 92-112 - The Rehabilitation Act of 1973 as amended. With the passage of federal legislation entitled *Americans with Disabilities Act (ADA)*, pursuant to section 504 of the Rehabilitation Act,

there is renewed focus on providing this population with the same opportunities enjoyed by all citizens.

As a faculty member, I am required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty of their need for accommodation and in providing authorized documentation through designated administrative channels. Information regarding specific diagnostic criteria and policies for obtaining academic accommodations can be found at www.uta.edu/disability. Also, you may visit the Office for Students with Disabilities in room 102 of University Hall or call them at (817) 272-3364.

Academic Integrity:
It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University.

"Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts." (Regents' Rules and Regulations, Series 50101, Section 2.2)

Student Support Services Available:
The University of Texas at Arlington supports a variety of student success programs to help you connect with the University and achieve academic success. These programs include learning assistance, developmental education, advising and mentoring, admission and transition, and federally funded programs. Students requiring assistance academically, personally, or socially should contact the Office of Student Success Programs at 817-272-6107 for more information and appropriate referrals.

Final Review Week:
A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabi. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. Classes are held as scheduled during this week and lectures and presentations may be given.

Drop for non-payment of tuition:
Payment must be received by the term due date of August 19 or your registration will be cancelled and your seat will be released. If your registration is cancelled for non-payment, you may re-register for classes only if seats are available.

Bomb Threats:
If anyone is tempted to call in a bomb threat, be aware that UTA will attempt to trace the phone call and procecute all responsible parties. Every effort will be made to avoid cancellation of presentations/tests caused by bomb threats. Unannounced alternate sites will be available for these classes. Your instructor will make you aware of alternate class sites in the event that your classroom is not available.

The University of Texas at Arlington has adopted the University email address as an official means of communication with students. Through the use of email, UT-Arlington is able to provide students with relevant and timely information, designed to facilitate student success. In particular, important information concerning registration, financial aid, payment of bills, and graduation may be sent to students through email.

After Hours Safety Escort

The Sam Mav Escort service provides a service to assist students, faculty, staff and campus visitors to reach their destinations after regular business hours. The hours of service are 7:00 p.m. to 1:00 a.m., Sunday through Saturday. 817-272-3381

MavMail:
All students are assigned an email account and information about activating and using it is available at www.uta.edu/email. New students (first semester at UTA) are able to activate their email account 24 hours after registering for courses. There is no additional charge to students for using this account, and it remains active as long as a student is enrolled at UT-Arlington. Students are responsible for checking their email regularly.