

A N S C 327 / 627
Tuesdays and Thursdays 11 AM to 12:15 PM (Room ANS 0408)

ANSC327 Molecular and Quantitative Animal Genetics; (3 credits)

Prerequisites: ANSC101, BSCI105, and CHEM103. Classical, molecular, and population genetics with specific emphasis on animal systems will be covered. The course will also disseminate molecular approaches for manipulating genetics at the whole animal level (transgenic and cloning). Other model organisms will be discussed to provide a conceptual framework.

Instructors: Dr. Iqbal Hamza

Office: Room 2413

Phone: 405-0649

Email: hamza@umd.edu

Dr. Frank Siewerdt

Room 1407

405-7721

siewerdt@umd.edu

Course TA: Xiaojing Yuan (xyuan12@umd.edu)

Course Objectives:

- To introduce students to the concepts of molecular genetics in animal systems.
- To introduce students to the concepts of quantitative genetics and quantitative methods of animal evaluation.
- To develop an understanding of the application of genetics principles for the improvement of domestic animals.

Office Hours:

Hamza: 12:15 pm – 1 pm after class on Thu

Siewerdt: 12:15 pm – 1 pm after class on Thu

Text:

The **primary textbook** used will be “*Genetics: Analysis of Genes and Genomes*, by Daniel L. Hartl, Elizabeth W. Jones” 5th edition, ISBN 0-7637-0913-1 or 6th edition

The **secondary textbook** recommended is “*Genetics: From Genes to Genomes*, by Leland Hartwell (Editor), Leroy Hood, Michael L. Goldberg, Ann E. Reynolds, Lee M. Silver, Ruth C. Veres, Ricki Lewis”, 2nd edition, ISBN 0-07-246248-5.

Grading:

Each of the three exams is worth 25% towards the final grade. Pop quizzes will account for the remaining 25% of the grade.

Exams:

All exams are closed book. Students are expected to bring calculators to exams.

Exam dates: Exam 1: **Mar 6**, Exam 2: **April 10**, Final Exam: Thursday May 15, 8-10 AM.

Final Exam: Dates and times are posted at <http://www.testudo.umd.edu/soc/exam200801.html>

Spring Break: Mar 17 – 21, 2008

Last Date for dropping a course: April 11, 2008

No make-up exams will be given, except for the following reasons:

- (a) Illness, confirmed by a doctor’s note
- (b) Death in the immediate family
- (c) Religious observance
- (d) Official University business

ANSC 627

Tuesdays and Thursdays

ANSC627 Molecular and Quantitative Animal Genetics; (3 credits)

Prerequisites: Permission of the Instructor. Classical, molecular, and population genetics with specific emphasis on animal systems will be covered. The course will also disseminate molecular approaches for manipulating genetics at the whole animal level (transgenic and cloning). Other model organisms will be discussed to provide a conceptual framework. Graduate students will have to submit a ten-page research report at the end of the course to fully complete the course.

Instructors: **Dr. Iqbal Hamza**

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Dr. Frank Siewerdt

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Course TA: Xiaojing Yuan (xyuan12@umd.edu)

Course Objectives:

- To introduce students to the concepts of molecular genetics in animal systems.
- To introduce students to the concepts of quantitative genetics and quantitative methods of animal evaluation.
- To develop an understanding of the application of genetics principles for the improvement of domestic animals.
- To prepare analytical evaluation of current and past original journal articles on genetics, molecular biology and biochemistry

Discussion Hours for Graduate Students: 45 mins TBA

Text:

The **primary textbook** used will be "*Genetics: Analysis of Genes and Genomes*, by Daniel L. Hartl, Elizabeth W. Jones" 5th edition, ISBN 0-7637-0913-1

The **secondary textbook** recommended is "*Genetics: From Genes to Genomes*, by Leland Hartwell (Editor), Leroy Hood, Michael L. Goldberg, Ann E. Reynolds, Lee M. Silver, Ruth C. Veres, Ricki Lewis", 2nd edition, ISBN 0-07-246248-5.

Grading:

Each of the three exams is worth 20% towards the final grade. Pop quizzes and Final Research Report will each account for 20% of the final grade.

Exams:

All exams are closed book. Students are expected to bring calculators to exams.

Exam dates: Exam 1: **Mar 6**, Exam 2: **April 10**, Final Exam: Thursday May 15, 8-10 AM.

Final Exam: Dates and times are posted at <http://www.testudo.umd.edu/soc/exam200801.html>

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Spring 2007 (updated Jan 28, 2008)

TOPICS	Chapter # Hartl & Jones	Chapter # Hartwell	Approx. dates per topic
HAMZA			
Introduction to Molecular Genetics	1	1	Jan 29
DNA structure and DNA manipulation	2	10,11	Jan 31, Feb 5
Transmission Genetics: The principles of segregation	3	2,3	Feb 7
Genes and Chromosomes	4	4	Feb 12, 14
Genetic Linkage and Chromosome Mapping	5	5	Feb 19,21,26
Molecular Biology of DNA replication and Recombination	6	6	Feb 28, Mar 4
EXAM 1: 75 mins			Mar 6
Molecular Mechanisms of Mutation and DNA repair	7	7	Mar 13,25
Molecular Organization of Chromosomes	8	12	Mar 27
Molecular Biology of Gene Expression	11	8	Apr 3,8
Molecular Mechanisms of Gene Regulation	12	17	Apr 15,17
Transgenics, Genetic Engineering and Genomics	13	Ref E	May 6,8
EXAM 2: 75 mins			Apr 10
SIEWERDT			
Introduction to quantitative genetics			Mar 11, Apr 1
Inbreeding and relationship			Apr 22
Heterosis			Apr 24
Heritability and repeatability			Apr 29
Selection			May 1
Recitation/Help session			May 13
Cumulative Final Exam (2 hours) http://www.testudo.umd.edu/soc/exam200801.html			Thursday, May 15, 8AM to 10 AM

Spring Break: Mar 17 – 21, 2008

**Guidelines for writing essay
ANSC627, Spring 2007**

- (a)** Marks will be awarded for a clear, concise essay written in grammatical English!
- (b)** Write not less than 10 and no more than 14 pages (8½ x 11") exclusive of illustrations and references. **Essay should be typed with one inch margin, 12 point Times Roman Font and doubled spaced.**
- (c)** Use drawings and other illustrations sparingly.
- (d)** References should be listed as follows:
- (i) for original papers:
 - (1) Andrews, N. C. (2002). Animal models of hereditary iron transport disorders. *Adv Exp Med Biol*, 509: 1-17.
 - (ii) for book chapters or review articles:
 - (1) Epstein, H. F., and Shakes, D. C. (Eds) (1995) *Caenorhabditis elegans: Modern Biological Analysis of an Organism* Vol. 48. *Methods in Cell Biology*. Edited by Wilson, L., and Matsudaira, P., Academic Press, San Diego.
 - (2) Ahringer, J. (2005) Reverse genetics. *WormBook*. Edited by The *C. elegans* Research Community, W., doi/10.1895/wormbook.1.7.1, <http://www.wormbook.org>.
- References should be cited in the text by number in brackets [eg: (1)], in-line with the rest of the text. The reference list should be in the order of citation, not in alphabetical order.
- (e)** Graduate students should write on a topic which is not connected with their dissertation research.
- (f)** Deadline for essay is **May 8th 2008**. Marks will be subtracted for late submissions!

Essay topics

Please consult with me before starting the essay and make up your mind by **March 13, 2007**.
If you wish to write an essay on a topic not listed below consult me.

High throughput analysis of gene expression (eg: Microarrays)

Forward and reverse genetic screens, Functional RNAi screens

Using animal models to dissect the function of specific genes

Transcription and RNA processing

Tissue-specific gene expression

Chromosomal context and patterns of gene expression

RNA Pol II basal transcription factors and gene expression

Transcriptional regulation by RNA polymerase II

Regulation of initiation of RNA polymerase II transcription

RNAi and gene silencing

Chromatin, nuclear receptors and transcription

Histone modifications and gene expression

Histone methylation and the regulation of gene expression

Chromatin, transcription, replication, and repair

Transcription and growth & development

Transcriptional control via intracellular receptors

Translational control of gene expression

Developmental control of gene expression

Genetic recombination, linkage analysis and mapping

Epigenetic gene silencing

Cell Cycle regulation and genetics of cancer

Academic Dishonesty:

The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit <http://www.shc.umd.edu>

Honor Code: <http://www.studentconduct.umd.edu/aca/honorpledge.html>

The University has a nationally recognized Honor Code, administered by the Student Honor Council. The Student Honor Council Proposed and the University Senate approved an Honor Pledge. The University of Maryland Honor Pledge reads:

"I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination".

Unless you are specifically advised to the contrary, the Pledge statement should be handwritten and signed on the front cover of all exams or assignments submitted for evaluation in this course. Students who fail to write and sign the pledge will be asked to confer with the instructor.

Academic accommodations:

If you have a documented disability and wish to discuss academic accommodations with me, please contact me as soon as possible. The Disability Support Service (a division of the Counseling Center), stands ready to assist faculty in determining and implementing appropriate academic accommodations. DSS will work closely with both faculty and students. You may contact the office (301) 314-7682, Rm. 0126 Shoemaker Hall.