

**MOLECULAR GENETICS 606**  
**MOLECULAR GENETICS II**  
**Spring 2005**  
**GENERAL INFORMATION**

**Lectures:**

**MWF 11:30 a.m. Room 1188 Postle Hall.**

**Recitations:**

**Tuesday 9:30 BI 0676**

**Tuesday 10:30 BI 0676**

**Tuesday 11:30 BI 0676**

**Course Objectives:**

Molecular Genetics 606 is part of the required core sequence for undergraduate students in the Department of Molecular Genetics, but it is also suitable for other students in the biological sciences who have had an introductory biochemistry course. The objective of this course is to continue to introduce students to the concepts and methods of modern genetics, and to help students learn to think like geneticists. All aspects of genetics are covered, including molecular, cellular, organismal, evolutionary, and population genetics. However, this course emphasizes the combined use of molecular and transmission genetic methods to solve basic problems.

**Prerequisites:**

Biochemistry 511 or equivalent, and Math 150.

**Lecturers:**

Dr. David M. Bisaro

201 Rightmire Hall

292-3281

bisaro.1@osu.edu

Office hours: by appointment

Dr. Susan E. Cole

282 Biological Sciences Bldg.

292-1914

cole.354@osu.edu

Office hours: Tuesdays 11:00-1:00

**Guest Lecturer:**

Dr. Paul Fuerst

386 Aronoff Lab, 318 W. 12th.

292-6403

fuerst.1@osu.edu

Office hours: by appointment

(Dr. Fuerst will deliver lectures on population genetics)

**Graduate Teaching Associates: Primary contacts.**

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**TA Office hours are by appointment only**

**Text:**

Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C., Gelbart, W.M., Suzuki, D.T., and Miller, J.H. *"Introduction to Genetic Analysis"* (2005) 8th edition. W.H. Freeman and Co., New York.

This is a required text. Readings in the text will for the most part correlate with the lectures.

**Supplementary Reading:**

It is often helpful to study material from several different sources; each will give a slightly different perspective, and different sources will emphasize different aspects of the subject. The following textbooks will give you some additional background (not required for the course):

**General texts with practice problems:**

Russell, P.J. (1996) *"Genetics"*, 4th edition. Harper Collins Publishers.

Tamarin, R.H. (1996) *"Principles of Genetics"*, 5th edition. Wm. C. Brown Publishers.

**For more information on molecular genetics:**

Lewin, B. (2004) *"Genes VIII"*. Pearson Prentice Hall.

**Course website**

<http://class.osu.edu>

**Examinations, Recitations and Grading:**

The course grade will be based on two midterms and one final examination, and points acquired from recitation exercises (450 possible points).

**RECITATIONS:** Weekly problem sets will be assigned and should be completed in full and handed in at the beginning of the recitation. Problem sets and questions that have arisen during lectures will then be reviewed during the recitation session. One or two problems from each assignment will be selected for grading, and your weekly point total will depend on your performance on those problems. Recitation assignments will be worth 50 points over the course of the quarter (approximately 5 points per week).

Many of the basic laws of genetics are mathematical in nature; so using these laws and making predictions based on them often requires mathematical manipulations. To pass this course, you only need algebra and some elementary probability theory (which we will teach you). The best way to ensure that you understand genetics is to solve problems that require you to apply what you are learning. Problems will also constitute a large portion of the questions on some exams. Therefore it is in your best interests to complete all assigned problems and participate fully during recitation sections.

**EXAMS:** There will be two midterms and one final worth 100, 100, and 200 points, respectively (total of 400 points). The final examination will be comprehensive, with approximately 60 points each covering material from each of the previous midterms and

80 points from the last portion of the course (covering material on which you will not have been previously tested). No makeup midterm examinations will be given. If you miss a midterm for any reason, the corresponding segment of the comprehensive final exam will be used to calculate a midterm grade (e.g.  $60 \times 1.66 = 100$ ) and will also contribute 60 points to your final exam score. You must not miss more than one midterm; this will result in an automatic E grade for the course. If you miss the final exam, you will be given an Incomplete. You will be allowed to make up the Incomplete grade only after presenting documentary proof that you missed the exam because of severe illness. Otherwise, your grade will be based on points received, counting the final exam as zero. The midterm exams are tentatively scheduled (see syllabus). The exams will be held during class time in the regular lecture room.

The course grade will be based on a modified curve, fitted to the total point scores for the course. Plus/minus grades will be given.

## TENTATIVE LECTURE SCHEDULE

### Dr. Cole's Lectures

Date	Chapter	Topic
Mar. 28	7	DNA Structure
Mar. 30	7	DNA replication
April 1	8	RNA and RNA transcription
April 4	8	RNA transcription and processing
April 6	9	Protein structure and genetic code
April 8	9	Protein translation
April 11	10	Regulation of Transcription
April 13	10	Regulation of Transcription II Prokaryotes
April 15	10	Regulation of Transcription III Eukaryotes
April 18	17	Cancer and Genetics
April 20	17	Cancer and Genetics

April 22-----FIRST MIDTERM

### Dr. Bisaro's Lectures:

Date	Chapter	Topic
April 25	14	Point mutations
April 27	14	Mutation mechanisms
April 29	14	Repair mechanisms
May 2	14	Homologous recombination and DS Break Repair
May 4	15	Polyploidy
May 6	15	Aneuploidy
May 9	15	Changes in chromosome structure
May 11	15	Changes in chromosome structure
May 13	5	Bacterial and viral genetics
May 16	5	Bacterial and viral genetics
May 18	13	Transposable genetic elements
May 20	13	Transposable elements in prokaryotes
May 23	13	Transposable elements in eukaryotes

May 25-----SECOND MIDTERM

### Dr. Fuerst's Lectures:

Date	Chapter	Topic
May 27	21	Evolutionary genetics
<b>May 30 - Memorial Day Holiday Observed</b>		
June 1	21	Evolutionary genetics
June 3	21	Evolutionary genetics

**FINAL EXAM LOCATION AND TIME:**

**Wednesday, June 8**

**11:30 AM to 1:18 PM**

**1188 Postle Hall**