

## Syllabus

The discipline of genetics touches on all other areas of biology, from evolution to medicine to molecular biology. It also has moved into an important place in the public awareness of biology, where information about genes and their (reputed) effects is reported and analyzed in the popular media and across the family dinner table. In this course, we have four learning objectives:

- 1) To understand the physical and chemical basis of genes and gene expression;
- 2) To consider the impact of genes on the organism;
- 3) To understand technical methods for studying and manipulating genes; and
- 4) To think about how genes behave in populations.

Biology 331 is intended for students majoring in Biology. Biology 107 and Biology 320 (or their

equivalents) are prerequisites. This means that we will expect that you have mastered the relevant material from those courses. Much of the early course material will be a review of topics from prerequisite courses, but we will also be introducing new material at an accelerating rate, so make sure you have a good grasp of the background.

Lecture sections meet three times each week. In lecture, the instructor will explain text material and answer student questions. Often, lecture quizzes will be given, usually covering material from the assigned reading. Attendance at lectures is required.

Laboratory sections meet for two hours once a week. Most laboratory meetings will begin with a quiz covering the assigned reading. Any assignments that are due in lab must be handed in before this quiz. In the laboratory, you will gather, analyze and present data. Attendance in laboratory is required. Often, you may have to visit the laboratory outside of your scheduled class times.



*DNA Cave*  
*Painting #21,*  
Jacques Deshaies

## Textbooks and Lab Manual

*Modern Genetic Analysis*, by Griffiths, et al.  
Second Edition.  
W. H Freeman and Company, 2002.

*Discovering Genomics, Proteomics,  
and Bioinformatics*,  
by Campbell and Heyer.  
CSHL Press, 2003.

The Griffiths textbook will be the main text, and contains a selection of problems and concept map exercises at the end of each chapter. These exercises are important in understanding text material, and will often be used on quizzes and exams. The Campbell textbook will be used as a secondary text, with assignments in lecture and laboratory.

Laboratory Manual materials must be picked up from the Biology Lab Supervisor's Office (KC 219) prior to the first laboratory session, and occasionally at other times during the semester. When you pick up the Laboratory Manual, you are required to pay a \$10 cash fee to cover the cost of laboratory materials.

## Exams, Labs, and Grading

There will be four one-hour exams and a two-hour final exam. All exams are comprehensive in that they build on previous material, but in general the one-hour exams will focus on material covered since the previous exam. Exams will include questions on laboratory material. The final exam will cover all areas of the course. The scores from examinations and lecture quizzes will contribute 75 % of the final course grade. Specifics of examination format and coverage will be provided by your instructor.

The first hour exam is divided in two parts, The review exam (25 points), given on the first Friday, will test topics from General Biology. Make sure you have reviewed for this exam! The second part of Exam I will be a normal hour exam worth 75 points.

The dates for the examinations are listed on the Biology 131: Spring 2004 Schedule. You are required

to take the exams on the scheduled dates. If there is a legitimate reason for not taking an examination on the scheduled date, the instructor should be notified as far in advance as possible. Only under these conditions will a make-up exam be given. Otherwise, a grade of zero will be assigned for the missed exam. True emergency situations are rare, but if an emergency causes you to miss an examination, a legitimate excuse must be provided and a make-up exam will be given at the instructor's discretion.

Laboratory assignments will contribute 25% of the course grade. See the section on laboratory grades following the schedule for a more detailed breakdown of laboratory grades. Like missed exams, missed laboratory exercises will result in a grade of zero. It is not normally possible to make up lab work.

Laboratory activities are designed to illustrate the principles presented in the lecture and textbook and to provide experience in the experimental approach to scientific questions. It is important for you to read the laboratory materials before class begins so that you and your partner(s) may begin work immediately. Most of the laboratory exercises will require a written report of the observations and interpretations. You must hand in your own lab report. Although data and conclusions may be the same within a lab group, the body of the report and any figures (tables and graphs) must be individual work. Any laboratory assignments that are turned in late will be assessed a penalty of at least 10% (one letter grade) per day.

Your final letter grade for the course is based on the following percentages of the maximum points possible:

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

Plus/minus grades will be given within the ranges above. There is no extra credit available in Biology 331.

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## Web Page

News, announcements, and instructor contact information are constantly updated on the course web site:

<http://faculty.evansville.edu/be6/b3314>

## Laboratory Reports and Portfolios

You must keep a laboratory portfolio in a three-ring binder which has been labeled, inside and out, with name and lab section. For most students this will be the same portfolio you used in Biology 107, and should contain all previous course work, as well as assignments from Biology 331. You should use tabbed, labeled dividers to organize the material in your portfolio. Your lab manual, which provides all of the instructions for each lab, must be kept separately from your lab portfolio. Biology majors and other students planning to take upper-level biology courses are required to turn in their portfolios to Mrs. Akrabawi at the end of the semester. They will be returned to you in future biology classes.

Lab reports must be submitted in the lab portfolio and placed in the marked boxes for each lab section during the first five minutes of the lab period when they are due. Please take care of tasks like stapling, hole punching and assembling your portfolio before you arrive in lab. When grading your lab assignments, instructors will review your previous work. Errors that are repeated will result in loss of points for the assignment.

Lab work will frequently be done in groups, but you are responsible for writing your own lab report. Sharing data is necessary, but sharing graphs, textual explanations and verbatim conclusions will be considered a violation of the university honor code. Reports are graded by lab group and it is obvious when students copy each other's work. Do your own work!

All written laboratory assignments will be checked for originality by computer. This means that any use of uncited text or copying will be detected. In addition to turning in a paper copy of your work to the instructor, you must submit an electronic copy to <http://www.turnitin.com>.

Your assignment will not be graded until the computer originality analysis is complete. Students are encouraged to visit the [turnitin.com](http://www.turnitin.com) website for more information on this plagiarism prevention system.

## Expectations

In order to make this a positive experience, you must be organized, prepared and attentive. Disruptive behavior (e.g., talking during lecture) will not be tolerated. Cell phones and pagers are not allowed in lecture or lab.

Our role is to help you succeed in your studies. Take full advantage of opportunities and do not hesitate to seek help and advice from your instructor. It is your responsibility to seek help when needed. Remember, your classmates are also a valuable resource in the learning process.

## Honor Code

We expect that you will abide by the University's honor code. This means that you will not give or receive unauthorized aid on examinations or assignments. The staff will explain how much collaboration among students is appropriate for lab assignments. When writing, all citations must be properly referenced. Do not use uncited text from any source, even with minor modifications. This constitutes academic dishonesty and will be detected and penalized harshly.

## Reading

All assigned reading is to be completed **before** class. When you are reading, read for understanding, and take notes. Text chapters should be completed before lecture. It is particularly important to complete laboratory reading before your lab section meets. Students who are not prepared for lab hinder the work of their lab partners and make it difficult for their group to complete the assigned tasks. Quizzes at the beginning of lab and lecture will give students the opportunity to demonstrate mastery of the assigned material.

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### Attendance

Attendance at all class meetings is required. If you miss an assignment with an excused absence, contact your instructor at the next class meeting. Unexcused absence will result in a grade of zero for any missed work. Make sure that your travel plans for spring break, Easter, etc. do not cause you to miss any classes, as these will be counted as unexcused absences.

This excused absence policy applies to athletes, musicians, and other students who need to miss class for competitions or performances. It is your responsibility to contact your instructor at least one week before each missed class period.

### Assignments

All assigned work must be turned in at the beginning of class, before the quiz. Late work will be assessed a penalty of at least 10% (one letter grade) per

day late. When using computers for writing, data analysis, or presentation graphics, be sure to back up your data often and check the status of printing, file transfers, etc. before the last minute. Failure of technology does not constitute a valid excuse.

### Instructor

Dr. Brian Ernsting  
Associate Professor of Biology  
Office: KC 223, Office phone: 488-1012  
be6@evansville.edu



RNA expression patterns of two pair rule genes, even-skipped (red) and fushi tarazu (black) in the *Drosophila* blastoderm. Each gene is expressed as a series of seven stripes. Anterior is to the left and dorsal is up.

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# Spring, 2004 Schedule

	Date	Lecture Topic	Text Reading	Lab Topic and Assignments (Assignments are due in lab)
Week 1	Jan 12	Genetics and the Organism	Chapter 1	<b>Lab 1A: Analysis of Lambda DNA</b>
	Jan 14	Gene and Genome Structure	Chapter 2	
	Jan 16	<b>Review Exam (25 points)</b>		
Week 2	Jan 19	MLK Day-No Class-Attend Campus Events.		<b>No Labs this week</b>
	Jan 21	Gene function	Chapter 3	
	Jan 23	DNA Transmission	Chapter 4	
Week 3	Jan 26	Mendelian Genetics	Chapter 5	<b>Lab 1B: Analysis of Lambda DNA</b>
	Jan 28	Exam Review		
	Jan 30	<b>Exam I (75 points)</b>		
Week 4	Feb 2	Recombination I	Chapter 6	<b>Lab 2A: PCR of PV92 Alu</b>
	Feb 4	Recombination II	Chapters 6-7	
	Feb 6	Recombination III	Chapter 7	
Week 5	Feb 9	Genetic Engineering I	Chapter 8	<b>Lab 2B: Analysis of PV92 Alu</b>
	Feb 11	Genetic Engineering II	Chapter 8	
	Feb 13	Genomics I	Chapter 9	
Week 6	Feb 16	Genomics II	Chapter 9	<b>Lab 3A: Bioinformatics I</b>
	Feb 18	<b>Exam II (100 points)</b>		
	Feb 20	Proteomics	Chapter C6	
Week 7	Feb 23	Mutation and Repair	Chapter 10	<b>Lab 3B: Bioinformatics II</b>
	Feb 25	Chromosome Mutation	Chapter 11	
	Feb 27	Mutational Dissection	Chapter 12	
Week 8	Mar 1	Gene Expression	Chapter 13	<b>Lab 4A: Virtual Flylab I</b>
	Mar 3	Genotype and Phenotype	Chapter 14	
	Mar 5	Cancer	Chapter 15	
Week 9	Mar 15	Cancer	Chapter 15	<b>Lab 4B: Virtual Flylab II</b>
	Mar 17	<b>Exam III (100 points)</b>		
	Mar 19	Development	Chapter 16	
Week 10	Mar 22	Development	Chapter 16	<b>Lab 5A: Microarrays</b>
	Mar 24	Population Genetics	Chapter 17	
	Mar 26	Population Genetics	Chapter 17	

Schedule, continued.

Week 11	Mar 29	Quantitative Genetics	Chapter 18	<b>Lab 5B: Microarrays and Cancer</b>
	Mar 31	Quantitative Genetics	Chapter 18	
	Apr 2	Evolutionary Genetics	Chapter 19	
Week 12	Apr 5	Evolutionary Genetics	Chapter 19	<b>Lab 6: Clinical Genetics</b>
	Apr 7	<b>Exam IV (100 points)</b>		
Week 13	Apr 14	Genome Circuitry	Chapter C7	<b>No Labs this week.</b> Assignments from Lab 5 are due.
	Apr 16	Genome Circuitry	Chapter C7	
Week 14	Apr 19	Integrated Circuits	Chapter C8	<b>Lab 7: Population Simulation</b> Assignments from Lab 6 are due.
	Apr 21	Integrated Circuits	Chapter C8	
	Apr 23	Whole Genome Circuits	Chapter C9	
	Apr 26	Exam Review		<b>Open Lab, Lab 7 Assignments Due.</b>
	May 4	<b>Final Exam (150 points) 10:15 AM, KC 100</b>		

## Lab Grades

The lab portion of Biology 331 is worth 25% of the course grade. The individual assignments contribute as outlined in the table below. There is no extra credit available in Biology 331.

Weekly Lab Quizzes	50 points
Lab 1      Analysis of Lambda DNA	60
Lab 2      PV92 Alu	60
Lab 3      Bioinformatics	40
Lab 4      Virtual Flylab	40
Lab 5      Microarrays	40
Lab 6      Clinical Genetics	20
Lab 7      Population Genetics	20
Lab Total:	330 points