

Syllabus, Spring, 2002

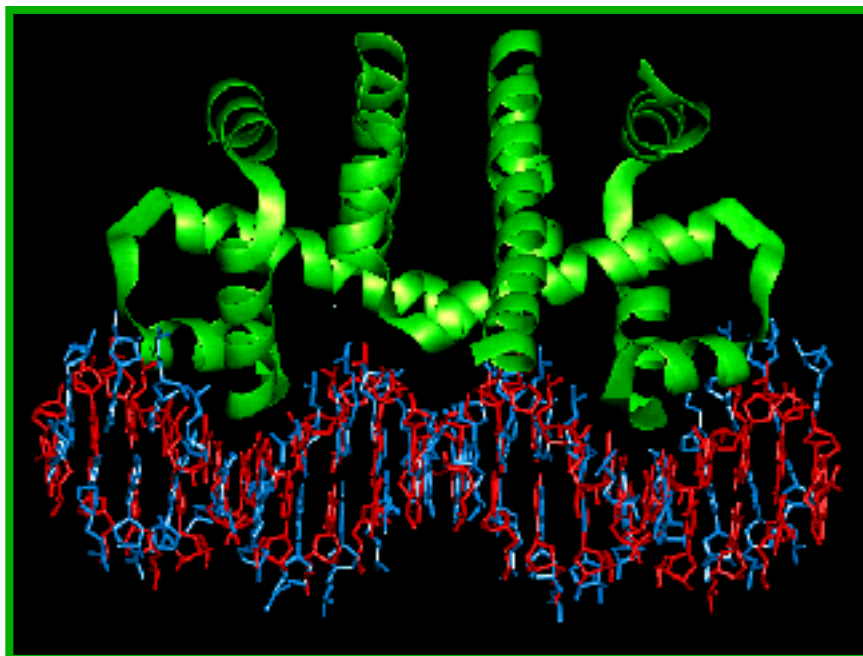
Course Description

This course is designed for biology and biochemistry majors who are interested in the structure and activity of genes and their products at the molecular level. A major goal of Biology 445 is learning how researchers use molecular techniques to answer biological questions. Although there are no formal prerequisites other than introductory biology, it is recommended that students complete genetics (Biology 331) and bacteriology (Biology 430) before registering for Biology 445. The course text, *Molecular Biology*, by Robert F. Weaver (2nd edition, 2002) is available in the U of E bookstore. The text will be supplemented regularly with other readings.

Lectures in Biology 445 begin with a brief review of topics from previous courses (Chapters 1-3). Students who need a more extensive review should consult their texts from General Biology or Genetics. The next section of the course introduces the techniques of molecular biology (Chapters 4 and 5). We will emphasize the application of each method in answer-

ing research questions. At the end of this section, there will be a take-home exam on the use of these methods in the current literature. Chapters 6-9 cover prokaryotic transcription and its regulation. The following Chapters (10-16) describe the same process in more complex eukaryotic systems. Translation (Chapters 17-19) and DNA replication (Chapters 20 and 21) are then introduced, each with a brief review of background information followed by a detailed description. The final lectures are a short introduction to genomic analysis (Chapter 24).

The laboratory component of Biology 445 is intended to simulate the process of discovery in a research environment. To this end, each lab group of two students is assigned to identify a gene from *E. coli* that has been shown to be regulated in response to environmental conditions. You will then construct a gene fusion and reproduce the regulation. This exercise requires extensive background research and planning on the part of the student investigators. There are several intermediate due dates as outlined on the schedule. Lab groups will present their experimental design and results regularly.



Trp Repressor - DNA Complex: Zhang et al., Nature 327:591 (1987)

Exams, Notebooks and Grading

There will be four exams and a final in this course. Exams will be given in laboratory, and may consist of multiple choice, experimental design and analysis, and short essay (less than one page) questions. The final exam is cumulative, and will also include essay questions. Exam questions will be based on lecture and laboratory material as well as assigned reading. If a student cannot take an exam on the scheduled date, and has a valid excuse, a makeup will be allowed. The instructor must be notified at least one week prior to the exam date, otherwise the student will receive a grade of zero for the exam. Each exam will contribute 15% of the course grade, for a total of 60%, laboratory work, including quizzes, presentations in class, and lab notebook, will contribute 20%, and the final exam will contribute 20%.

Students should keep two notebooks for Biology 445. The first may be of any type, and should contain reprints, class notes and notes from readings. The second notebook must be a bound notebook. This notebook should contain experimental design, protocols for experiments, results, and analysis. Students are required to number the pages in this notebook and obtain the signature of the instructor or lab helper before and after each experiment. These notebooks must be brought to each class meeting, and may be collected for grading at any time. Students whose laboratory notebooks are incomplete or missing when requested will receive a grade of zero for that class period.

Course grades will be assigned using the following scale. Pluses and minuses will be assigned within grade ranges.

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

Web Page

News, announcements, and instructor contact information are constantly updated on the course web site: <http://cedar.evansville.edu/~be6/b4452>

Expectations

Academic Honor Code

Students are expected to abide by the University's Honor Code. Accordingly, students are expected to neither give nor receive unauthorized aid on exams, lab reports, or class papers. When writing, all citations must be acknowledged and referenced. If in doubt about how to use references in your writing, please see your instructor. Do not use uncited text from any source in your written assignments, even with minor changes. This constitutes academic dishonesty, and will be penalized harshly.

Reading

All assigned reading is to be completed before class. This is important so that students begin with the required background. Quizzes at the beginning of class will give students an opportunity to demonstrate mastery of the assigned reading.

Attendance

Attendance at all class meetings is required. Unexcused absence will result in a grade of zero for any missed assignments. Students excused from a class meeting will be responsible for making up the missed material.

Assignments

Assignments are to be turned in on time, with the exception of excused absence. Students with excused absence should turn in their work the following day. When using computers for writing, data analysis, or presentation graphics, be sure to back up often and check the status of file transfers, printing, *et cetera* before the last minute. Failure of technology does not constitute a valid excuse.