

**CEDAR CREST COLLEGE**  
**MOLECULAR BIOLOGY (FSC 511)**  
**SPRING 2010**

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**Office Hours:** Monday 10-12, Wednesday 10-12, and by appointment

**Course Information**

**Prerequisites:** Admission to the Master's in Forensic Science Program or permission of the instructor

**Texts:**

Watson, Caudy, Myers, and Witkowski: *Recombinant DNA: Genes and Genomes—A Short Course* (ISBN: 978-071672866-5)

**Description:** This three-credit, lecture course is part of the graduate program in Forensic Science. The course begins with an examination of basic molecular biology including the structure of DNA, methodology of DNA replication, regulation of gene expression, and consequences of DNA mutations. The use of recombinant DNA and its applications in the study of human genetics will be explored as well as the impact of biotechnology on society.

**Goals:** The goal of the course is to increase your knowledge of molecular biology as you examine its relationship to other fields such as genetics, cell biology, and biochemistry. In addition, you will consider how the field of biotechnology developed from our knowledge of gene organization and regulation. Finally, you will explore the applications of biotechnology to human genetics.

**Objectives:** At the completion of this course, students will be able to:

- 1) Understand basic concepts in molecular biology.
- 2) Design basic experiments to answer questions in molecular biology, understand many molecular laboratory techniques used in biotechnology, and analyze data obtained from basic molecular experiments.
- 3) Review current research, including background and experimental information.
- 4) Discuss relevant issues in biotechnology.
- 5) Discuss contrasting opinions on the ethics of scientific discovery, and the impact of research on society

**Outcomes and Assessment:**

- 1) Students will have a general knowledge of the mechanisms of DNA replication and prokaryotic transcription. This knowledge will be assessed

through lecture examinations in which students will be asked to recall details from information presented in lectures and labs.

- 2) Students will demonstrate critical thinking in the design and analysis of molecular experiments. This ability will be assessed through lecture examinations in which students will be asked to design experiments to answer questions presented to them. They will also be asked to interpret given data on exams as well as their own data in their lab notebooks.
- 3) Students will demonstrate the ability to understand new concepts in molecular biology and be capable of explaining these concepts to others. Students will be assessed during class discussions centered around current research papers that they will read, understand, criticize, and discuss with classmates.
- 4) Students will be engaged in discussions about current issues in the field of molecular research. They will be asked to think about various aspects of relevant topics and respond to questions in small and large discussion groups. Students will be assessed through a one-page response paper.
- 5) Students will explore societal issues and concerns regarding research practices and discoveries. Students will be assessed through class presentations, one of which will be developed into a workshop presented at the Health and Wellness Conference.

### **Grading**

**Lecture Exams:** There will be 4 exams, each approximately 50 minutes in length. Exams are mixed format (multiple choice, matching, fill-in-the-blank, define, short essay, etc.), with a bias towards essay questions. Although none of the exams will be comprehensive, a general understanding of material presented earlier in the semester will be necessary. If you know that you will be absent from class on an exam date, see me *prior* to that date and we will set up a time for you to make up the exam. Students who fail to show up for an exam must obtain permission from the Dean of Students office before a makeup test will be arranged. The dates for the first three exams are indicated on the course schedule. The fourth exam and lab exam will be given on the final exam date. Each exam is worth 15% of your total grade, for a total of 60% in the grade calculation.

**Paper Discussion:** You will be leading a discussion on an assigned scientific paper relating to topics presented in class. General background information pertaining to your paper can be found in your textbook and will be presented in class by your instructor prior to the date of your presentation. It is your responsibility to familiarize yourself with the textbook information, as well as research additional relevant details. Your classmates will be required to read the paper in advance of class and send you at least two questions that they had in regard to the paper. You should develop answers to these questions and incorporate them into your paper discussion. During class, it will be your job to walk your classmates through the paper, asking them questions as you go to include them in the discussion. Your questions should be designed to lead students through the figures and help them to understand the methods used and the conclusions that were drawn. Leading this discussion will be worth 15% of your final grade. You must present your paper on your chosen date. Students who fail to show up for their presentation must

obtain permission from the Dean of Students office before a makeup date will be arranged.

**Class Projects:** There are three projects that you will be expected to complete during the course of the semester. Each will be assigned in class, following the discussion of these two topics. Completion of the class projects will account for 15% of your final grade (5% each).

**Participation:** It is vital that you participate in all class discussions. Students who do not take an active role in their education will not succeed in this class. You are expected to come prepared to class, participate in classroom discussions, respond to questions, and complete all course work in a timely manner. You will be required to read each of the papers that will be discussed in class and generate at least two intelligent questions that you will send electronically to both the presenter and the instructor by 11pm on the night before the discussion. During the paper discussions, you will be expected to participate by answering questions posed by the discussion leader and by asking additional questions to clear up any confusion that you might have. Both asking questions and answering questions during paper discussions will count as part of your participation grade. Altogether, participation will account for 10% of your final grade.

**Grade Tally:**

4 Exams	60%
Class Presentation	15%
Class Projects	15%
Class Participation	10%

**Grading Scale:**

92.0 – 100	A	78.0 – 79.9	C+
90.0 - 91.9	A-	72.0 – 77.9	C
88.0 – 89.9	B+	70.0 – 71.9	C-
82.0 – 87.9	B	69.9 – 60.0	D
80.0 – 81.9	B-	less than 59.9	F

**Academic Philosophies**

**Honor Code:** Students are expected to comply with the Cedar Crest College Honor Code as stated in the Catalog.

**Classroom Protocol:** Students are expected to comply with the Cedar Crest College Classroom Protocol Code as stated in the Catalog. Cell phones will not be tolerated in the classroom or laboratory. Make sure that you turn off your phone’s ringer prior to entering the class/lab.

**Plagiarism:** Students are expected to comply with the Cedar Crest policy on plagiarism. This includes “self-plagiarism” in which the student uses the same assignment for two different courses. I expect that all work handed in for a grade is original and entirely the

work of the student submitting it. Cases of plagiarism, whether deliberate or accidental, will not be tolerated and will result in an “F” for the given assignment.

**Learning Disabilities:** Students with documented disabilities who may need academic accommodations should discuss these needs with me during the first two weeks of class. Students with disabilities who wish to request accommodations should contact the Advising Center.

**Attendance:** You are expected to attend and actively participate in all lectures and laboratory exercises. I expect you to arrive to class in a timely manner. It is your responsibility to inform me of planned absences and it is your responsibility to obtain any assignments, handouts, etc. Absences on days of exams, presentations, or the collection of assignments will have to be approved by the Dean of Students. If the Dean of Students does not approve the absence, you will receive a zero for that portion of your grade. Your obligation for this course includes attendance at the final exam on the day and time scheduled by the Registrar’s Office. You should not make travel arrangements (nor should your family make them for you) until the final exam schedule is published. If you must make plans early, you should schedule your travel after the last final exam day. In regards to lab, be warned: most molecular biology experiments do not fit neatly into a three-hour time period. You will be expected to come into lab on other days and times to continue your work. Make arrangements with your lab partner to pick a time best suited to your schedules, and make sure that you completely understand procedures that you will be doing outside of the lab period, as I may not be available to help you at these times.

### **The Bottom Line**

Your success in this class is up to *you*. I can help you to understand difficult material, but it is your responsibility to read the material before coming to class, to take notes, and to organize information so that you can retrieve it. If you need help improving your study skills, talk to me. I will not know that you are having trouble until test time, and by then, it might be too late!

\_\_\_\_\_ Name

## CLASS PARTICIPATION ASSESSMENT

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### Questions for Student Paper Discussions

Describe the quality of your preparation for class presentations given by your colleagues (e.g. did you read the paper, try to understand the topic, etc.):

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Did you develop at least two questions for each of the papers in advance of the discussion? Comment on the quality of the questions that you posed.

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Did you participate in all of the paper discussions? To what extent?

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### Lecture Questions:

Did you participate in class lectures by asking and answering questions?

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### Seminar Questions:

Did you attend seminars outside of class? To what extent did you participate in these seminars—did you ask questions of the speaker?

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My class participation grade should be \_\_\_% because...



**Molecular Biology (FSC 511)**  
**Spring 2010 Tentative Schedule (subject to change)**

Week	Week of	Monday	Wednesday	Friday
1	January 18	No Class	Genetics & Cell Review (Ch 1)	Genetics & Cell Review (1)
2	January 25	Replication (Ch 1)	Student Paper Presentation #1 Strzalka et al	Student Paper Presentation #2 Strzalka et al
3	February 1	Replication and Damage Repair (Ch 1)	Transcription Polymerases (Ch 2)	Student Paper Presentation #3 Li et al
4	February 8	Features of Eukaryotic Genes (Ch 3)	Exam 1 (Ch 1, 2)	Student Paper Presentation #4 Taheny et al
5	February 15	Bioethics Project Due Controlling Gene Expression (Ch 5)	Student Paper Presentation #5 Xu et al	Student Paper Presentation #6 Xu et al
6	February 22	AAFS Meeting: No Class		
7	March 1	Post-transcriptional Modification (Ch 5)	Translation (Ch 2)	Student Paper Presentation #7 Drummond et al
8	March 8	Spring Break		
9	March 15	Mitosis and Meiosis (Ch 1, 8)	Epigenetics (Ch 8)	Student Paper Presentation #8 Fraga et al
10	March 22	Recombinant DNA (Ch 4)	Recombinant DNA (Ch 6)	Student Paper Presentation #9 Khun et al
11	March 29	Exam 2 (Ch 2, 3, 5, 8)	DNA Fingerprinting (Ch 16)	Break: No Class
12	April 5	Tuesday is Monday RNAi (Ch 9)	DNA Project Due Human Genetics (Ch 14)	Student Paper Presentation #10 Napoli et al
13	April 12	Human Genetics (Ch 14)	Cancer Biology (Ch 15)	Student Paper Presentation #11 Saito et al
14	April 19	Exam 3 (Ch 4, 6, 16, 9)	Cancer Biology (Ch 15)	Student Paper Presentation #12 Verma et al
15	April 26	Genomics (Ch 10)	Student Paper Presentation #13 Scully et al	Student Paper Presentation #14 Wang et al
16	May 3	Genomics Project Due Human Genome Project (Ch 11)	Wednesday is Friday Student Paper Presentation #15 Polesani et al	