Syllabus for

CHE 454--Recombinant DNA Technology

3.0 Credit Hours

Spring 2009

I. COURSE DESCRIPTION

A study of the structural, chemical, and physical characteristics of DNA and protein synthesis. Discusses molecular biology of the gene and the cell along with the recent advancement of recombinant DNA technology.
Prerequisites: CHE 212 Lecture and Lab

II. COURSE GOALS

The purpose of this course is to give students a broad foundation in DNA technology. The advancement of recombinant DNA technology adds a new dimension to life science and provides a powerful tool for genetic engineering. By encountering the molecular biology of the gene and the cell, students learn to analyze problems encountered in medicine and other related biomedical disciplines at the molecular level. Ethical discussions of the technology will increase appreciation of God's orderly and complex creation.

III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

Terminal Objectives
Upon successfully completing this course, the student will be able to do the following:

A. Give experimental evidence demonstrating that DNA is the molecule of heredity in all organisms.

B. Explain the flow of genetic information from DNA to RNA to protein.

C. Describe the functions of topoisomerase, DNA polymerase I, DNA polymerase III, DNA ligase, helicase, and rep protein in DNA replication.

D. Discuss the current concepts of DNA replication, transcription, and translation in prokaryotes and eukaryotes.

E. List the difference between prokaryotes and eukaryotes in regulation of gene expression.

F. Use programs from the internet to access and manipulate genetic information.

G. Articulate a Christian perspective on the use of modern DNA technologies.

H. Contribute to the ethical discussion of the impact of modern DNA technologies on society.

IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

Required Materials

Textbooks

Nelson, David L. et al. Lehninger Principles of Biochemistry, 5th ed. New York: Worth Publishers, 2008.

Young, Paul G. Exploring Genomes. New York: W.H. Freeman, 2007.

V. POLICIES AND PROCEDURES

A. University Policies and Procedures

1. Attendance at each class or laboratory is mandatory at Oral Roberts University. Excessive absences can reduce a student's grade or deny credit for the course.
2. Students taking a late exam because of an unauthorized absence will be charged a late exam fee.
3. Students and faculty at Oral Roberts University adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print, video, multimedia, or computer software. By submitting an assignment in any form, the student gives permission for the assignment to be checked for plagiarism, either by submitting the work for electronic verification or by other means.
4. Final exams cannot be given before their scheduled times. Students need to check the final exam schedule before planning return flights or other events at the end of the semester.
5. Students are to be in compliance with University, school, and departmental policies regarding ePortfolio requirements. Students should consult the ePortfolio handbooks for requirements regarding general education and the students' majors.
    a. The penalty for not submitting electronically or for incorrectly submitting an ePortfolio artifact is a zero for that assignment.
    b. By submitting an assignment, the student gives permission for the assignment to be assessed electronically.

B. School and/or Department Policies and Procedures

1. The Department of Chemistry adheres to the Assessment policy concerning plagiarism as described in the University Catalog, "Written assignments using sources must demonstrate ethical and accurate use of source material. Plagiarism and any unethical or inappropriate use of sources will not be tolerated."
2. The following assessment actions will be taken in the of event of documented instances of plagiarism on written assignments, copying of homework assignments, or cheating during examinations:
    a. An automatic zero will be given for the assignment or exam.
    b. The original assignment or exam will be kept in the student file and a copy will be given to the student. This could have a negative impact on letters of reference and admission to graduate schools and other postgraduate programs.
    c. The Department will take repeated offences as grounds for further action.
3. Any ePortfolio assignment required in this course must be completed and assessed prior to the end of the semester to receive credit for that assignment; otherwise the assignment will receive a grade of zero.

C. Course Policies and Procedures

1. Evaluation Procedures

35%	Exams
10%	Quizzes
25%	Book/Article Reviews/Computer Projects
10%	Research Presentation
20%	Final exam
100%	

The semester's grade based on above is as follows:

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

2. No ePortfolio requirements

VI. COURSE CALENDAR

Week	Topic
1	Nucleic Acids
2	Transcription
3	Translation
4	Genetic Code
5	RNA
6	DNA Replication
7	DNA Repair
8	DNA Recombination
9	Recombinant DNA methods
10	Protein Synthesis
11	Genes
12	Genomes
13	Student Presentations
14	Gene Expression
15	Ethical Considerations

Course Inventory for ORU's Student Learning Outcomes

CHE 454 Recombinant DNA
Spring 2009

This course contributes to the ORU student learning outcomes as indicated below:
Significant Contribution – Addresses the outcome directly and includes targeted assessment.
Moderate Contribution – Addresses the outcome directly or indirectly and includes some assessment.
Minimal Contribution – Addresses the outcome indirectly and includes little or no assessment.
No Contribution – Does not address the outcome.

The Student Learning Glossary at http://ir.oru.edu/doc/glossary.pdf defines each outcome and each of the proficiencies/capacities.

OUTCOMES & Proficiencies/Capacities		Significant Contribution	Moderate Contribution	Minimal Contribution	No Contribution
1	**Outcome #1 – Spiritually Alive** Proficiencies/Capacities				
1A	Biblical knowledge				X
1B	Sensitivity to the Holy Spirit			X	
1C	Evangelistic capability			X	
1D	Ethical behavior		X		
2	**Outcome #2 – Intellectually Alert** Proficiencies/Capacities				
2A	Critical thinking	X			
2B	Information literacy	X			
2C	Global & historical perspectives		X		
2D	Aesthetic appreciation				X
2E	Intellectual creativity		X		
3	**Outcome #3 – Physically Disciplined** Proficiencies/Capacities				
3A	Healthy lifestyle			X	
3B	Physically disciplined lifestyle				X
4	**Outcome #4 – Socially Adept** Proficiencies/Capacities				
4A	Communication skills			X	
4B	Interpersonal skills			X	
4C	Appreciation of cultural & linguistic differences				X
4D	Responsible citizenship			X	
4E	Leadership capacity				X