Syllabus Chemistry 7770, Spring 2019
Biochemical Basis of Gene Expression: Nucleic Acid Protein Interactions

1 credit Prof. Ryan Jackson, W345, 797-1635, ryan.jackson@usu.edu

Meeting times WRF 2/13 – 3/8: Wed 9-10 am (ML 151), Thurs 10-11 am (WID 330), Friday 1:30-2:30 (WID 330)

OFFICE HOURS:
By appointment.

GOALS:
This course is part of the core graduate level biochemistry courses offered at USU. This section will focus on nucleic acid structure and function in both prokaryotic and eukaryotic systems. Students will understand how the three dimensional structure of nucleic acids depict specific functions. Students will be able to describe the general mechanisms used by proteins to recognize nucleic acid sequence and will be familiarized with methods to probe nucleic acid structure and function. We will also discuss methods used to analyze protein nucleic acid interactions including single-molecule and structural methods.

MEETINGS
The lecture days and times will be established during the first week of classes. In scheduling the class meeting times, first priority will be to accommodate biochemistry graduate students.

TEXT:
A current biochemistry text book such as *Lehninger Principles of Biochemistry*, by Nelson and Cox is recommended as background reading. Content beyond the textbook level will be drawn from a variety of specialty books, current review articles, and the primary literature. Materials for the course, including literature, will be available on the course Canvas page.

PREREQUISITES:
A full year of undergraduate organic chemistry; a full year of undergraduate biochemistry (comparable to CHEM 5700-5710 at USU), with physical chemistry recommended.

ONLINE INFO:
Classroom handouts, class standings, exam keys, etc. will be available on the course Canvas page at canvas.usu.edu. Username = banner ID; password = banner pin.

EXAMS:
There will be two examinations worth 100 points each during the course. Missed exams will be scored as a zero. Make-up exams are possible only for excused absences by appointment. Exams are closed book. Exams will take place outside of the normal class period—scheduling will be done through the testing center.

Projects:
Two projects each worth 20 pts will given in the course

GRADING:
Grading is based on the points earned on the exams, participation and class projects.

Two exams @ 100 points each	200 points
Two projects @ 20 points each	40 points
In class participation	20 points

Total	260 points

ASSESSMENT:
Assessment of the course will include the University online IDEA evaluation conducted at the end of the course. Information from the evaluation will be used to improve the course.

PROVISIONS: This course will adhere to the USU Academic Policies and Procedures Manual found at the web site http://www.usu.edu/policies/ and in the student code http://www.usu.edu/studentservices/studentcode/. Any student with a disability who requires accommodation must contact the instructor. The disability must be documented by the Disability Resource Center. Course materials may be requested in alternative formats.

TENTATIVE **Outline of Topics/Schedule/Reading material**

Date	Topics	Read (name of article)
Feb 13 Feb 14 Feb 15	Nucleic Acid Structure 1 Discuss DNA polymerase paper Nucleic Acid Structure 2 - 3DNA tool	 Johnson Cell, DNA polymerase Assignment #1
Feb 20 Feb 21 Feb 22	Protein Nucleic Acid Interactions Discuss RNA polymerase Paper Sequencing methods Sanger, DEEP, RNAseq, Illumina, etc.	Johnson Cell, DNA polymerase
End of 2nd week	**EXAM 1**	Take exam 1 in testing Center Week 2/25 – 3/1
Feb 27 Feb 28 Mar 1	Methods 2 to analyze protein nucleic acid interactions Discuss Ribosome Paper Regulation of Ribosome / DNA polymerase / ATP motor	Assignment #1 due Assignment #2 assigned
Mar 6 Mar 7 Mar 8	RNA Guided complexes CRISPR, RNAi, RNAa, Discuss CRISPR paper Electrophoresis, SPR, Footprinting, Cross linking, single molecule, HDX	Jinek et. al. 2012.
End of 4th week	**EXAM 2**	Take exam 2 in testing center Week March 17
March 18th		Assignment #2 due