CSAT 5007
Methods in Cell Biology

Fall, 2019

CLASS DAYS and TIME: Tuesday and Thursday: 2PM-5PM

CLASSROOM: STRF 2.290 (Lecture), STRF 2.294 (Chen Lab), STRF mouse Facility, STRF 2.252 (Imaging Core), STRF 2.269 (Liu Lab), GCCRI GSF (Genome sequencing facility)

COURSE FACULTY: Dr. Lizhen Chen, Dr. Exing Wang, Dr. Zhijie Liu, Dr. Zhao Lai

OFFICE LOCATION and HOURS: STRF 2.292.4

EMAIL: ChenL7@uthscsa.edu; WangE3@uthscsa.edu; LiuZ7@uthscsa.edu; Laiz@uthscsa.edu;

TELEPHONE: Chen: 562-5062; Wang: 562-4062; Liu: 567-8734; Lai: 562-9246

READ THIS DOCUMENT CAREFULLY - YOU ARE RESPONSIBLE FOR ITS CONTENTS.

COURSE DESCRIPTION AND OBJECTIVES

This course is a hands-on course that covers techniques that are used in the molecular biology laboratories including cell culture, DNA/RNA/protein isolation, PCR and Real-time PCR analysis, western blot, molecular cloning, CRISPR genome editing, deep sequencing (data analysis), microscopy, Immunological methods and approaches used in genomic analyses. In addition, we cover inheritance and genetic crosses using *C. elegans* model. We also cover basics on how to analyze deep-sequencing data set.

Pre-requisites – No prerequisite

Semester credit hours – 1 credit hour

By the end of this course, each student should be able to:

- Know the basic concept of the molecular biology techniques .
- Independently perform experiments that require these techniques.
- Troubleshoot and find solutions for techniques that didn't work.

COURSE ORGANIZATION

The main teaching modalities used in this course include:

1) Hands-on laboratory-based training

2) Didactic

Materials – Standardized protocols

Computer Access – Computer with capabilities to handle large data set.

Reading Assignments – Not applicable

ATTENDANCE

It is expected that students will attend all classes.

TEXTBOOKS

Required: Not applicable

Recommended: Not applicable

GRADING POLICIES AND EXAMINATION PROCEDURES

Students will be graded based on their participation, initiative, their ability to perform research techniques and their lab notes.

Grading System

Include a grading scale used to determine final grades, see example below

A = 90-100% B = 80-89% C = 70-79% F = < 69%

REQUESTS FOR ACCOMODATIONS FOR DISABILITIES

In accordance with policy 4.2.3, **Request for Accommodation Under the ADA and the ADA Amendments Act of 2008 (ADAAA)**, any student requesting accommodation must submit the appropriate request for accommodation under the American with Disabilities Act (ADA, form 100) to his/her appropriate Associate Dean of their School and a copy to the ADA Coordinator. Additional information may be obtained at http://uthscsa.edu/eeo/request.asp.

ACADEMIC INTEGRITY AND PROFESSIONALISM

Any student who commits an act of academic dishonesty is subject to discipline as prescribed by the UT System Rules and Regulations of the Board of Regents. Academic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an exam for another person, signing attendance sheets for another student, and any act designed to give unfair advantage to a student or the attempt to commit such an act. Additional information may be obtained at http://catalog.uthscsa.edu/generalinformation/generalacademicpolicies/academicdishonestypolicy/

TITLE IX AT UTHSCSA

Title IX Defined:
Title of the Education Amendments of 1972 is a federal law that prohibits sex discrimination in education. It reads "no person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance."

University of Texas Health Science Center San Antonio's Commitment:
University of Texas Health Science Center San Antonio (UTHSCSA) is committed to maintaining a learning environment that is free from discriminatory conduct based on gender. As required by Title IX, UTHSCSA does not discriminate on the basis of sex in its education programs and activities, and it encourages any student, faculty, or staff member who thinks that he or she has been subjected to sex discrimination, sexual harassment (including sexual violence) or sexual misconduct to immediately report the incident to the Title IX Director.

In an emergency, victims of sexual abuse should call 911. For non-emergencies, they may contact UPD at 210-567-2800. Additional information may be obtained at http://students.uthscsa.edu/titleix/

EMAIL POLICY

Students can directly email instructors for any questions about the class.

USE OF RECORDING DEVICES

N/A

ELECTRONIC DEVICES

Students are allowed to use computers for taking notes and going over class materials.

At the end of the syllabus include a detailed class schedule (see example below), which includes class dates, topic or title of lessons, reading or assignment due dates, test dates, and other important events such as holidays, etc. It is a good idea to clearly identify the class **schedule** as TENTATIVE, depending upon the progress of the class.

TENTATIVE CLASS SCHEDULE

CSAT 5007

Methods in Cell Biology

Fall, 2018

WEEK	DATE	TOPIC	Instructor and Modality
Week 1	**08/20/19**	Course overview; lab note; *C. elegans* handling; Start genetic cross	Dr. Lizhen Chen ChenL7@uthscsa.edu
	08/22/19	Tour of the mouse vivarium; Basic animal handling procedures; Animal Identification methods: male vs female (young/new born), mouse genotyping with PCR	Dr. Lizhen Chen ChenL7@uthscsa.edu
Week 2	**08/27/19**	Genetic cross continued (picking F1 generation) Mouse genotyping continued (DNA gel electrophoresis) Mammalian cell culture (seed cells for immunostaining and CRISPR)	Dr. Lizhen Chen ChenL7@uthscsa.edu
	08/29/19	CRISPR (principle, sgRNA design) CRISPR transfection Fix cells for immunostaining (store in blocking buffer)	Dr. Lizhen Chen ChenL7@uthscsa.edu
Week 3	**09/03/19**	Genetic cross continued (picking F2 generation) Immuno-staining Collect CRISPR cells for western blot, measure protein concentration	Dr. Lizhen Chen ChenL7@uthscsa.edu
	09/05/19	Fluorescence microscopy (Immuno-staining imaging) Make SDS-PAGE gel for western blot	Dr. Lizhen Chen ChenL7@uthscsa.edu
Week 4	**09/10/19**	Tour to Imaging core facility (STRF 2.252) Genetic cross continued (Genotype confirmation) Western blot (gel running, transfer, blocking)	Dr. Exing Wang WangE3@uthscsa.edu Dr. Lizhen Chen ChenL7@uthscsa.edu

	09/12/19	Western blot continued Molecular Cloning (APE software, ligation)	Dr. Lizhen Chen ChenL7@uthscsa.edu
Week 5	**09/17/19**	Molecular Cloning (plasmid transformation) Real-time PCR (principle, primer design, experiment)	Dr. Lizhen Chen ChenL7@uthscsa.edu
	09/19/19	Molecular Cloning (plasmid mini-prep and restriction enzyme digestion followed by gel electrophoresis) Real-time PCR (data analyses)	Dr. Lizhen Chen ChenL7@uthscsa.edu
Week 6	**09/24/19**	RNA isolation from mouse tissue (using Trizol kit) RNA quantification & quality check using Nanodrop Methods used for genomic analyses (RNA-seq, ChIP-seq, ATAC-seq, CLIP-seq)	Dr. Lizhen Chen ChenL7@uthscsa.edu Dr. Zhijie Liu LiuZ7@uthscsa.edu
	09/26/19	Deep Sequencing core facility tour and experimental set up Deep sequencing Data Analysis including genome browser and GO-term analyses	Dr. Zhao Lai LaiZ@uthscsa.edu Dr. Zhao Zhang ZhangZ3@uthscsa.edu