

# CSAT 5007 Methods in Cell Biology

Fall, 2024

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**CLASS DAYS and TIME:** Wednesday and Friday: 9AM-12PM (6 weeks, 08/28/24 – 10/04/24)

**CLASSROOM:** STRF 1.102, Barshop Building 2040 (Chen Lab), and others

**COURSE DIRECTOR:** Dr. Lizhen Chen

**COURSE FACULTY:** Dr. Lizhen Chen, Dr. Su-Hyuk Ko, Dr. Gang Huang, Dr. Zhao Zhang, Dr. Zhao Lai

**TEACHING ASSISTANT:** Perna Sathish

**OFFICE LOCATION and HOURS:** Barshop Building 2055

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**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/eoo/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, 2024**

WEEK	DATE	TOPIC	Instructor and Modality
Week 1	08/28/24	<b>(Meet at STRF 1.102 at 9am)</b> Course overview; lab note; <i>C. elegans</i> handling; Start genetic cross	Dr. Lizhen Chen <a href="mailto:ChenL7@uthscsa.edu">ChenL7@uthscsa.edu</a>
	08/30/24	Tour of the vivarium; Basic mice animal handling procedures; Animal Identification methods: male vs female; IP injection; Animal sedation; Animal euthanization; Tissue dissection	Dr. Su Hyuk Ko <a href="mailto:KoSH@uthscsa.edu">KoSH@uthscsa.edu</a>
Week 2	09/04/24	CRISPR (principle, sgRNA design)  Molecular Cloning (CRISPR vector transformation, APE software)  Genetic cross continued (picking F1 generation)	Dr. Lizhen Chen <a href="mailto:ChenL7@uthscsa.edu">ChenL7@uthscsa.edu</a>
	09/06/24	Molecular Cloning (plasmid prep, digestion, DNA gel electrophoresis)	Dr. Su Hyuk Ko <a href="mailto:KoSH@uthscsa.edu">KoSH@uthscsa.edu</a>
Week 3	09/11/24	Mammalian cell culture (seed cells for transfection)  Genetic cross continued (picking F2 generation)	Dr. Lizhen Chen <a href="mailto:ChenL7@uthscsa.edu">ChenL7@uthscsa.edu</a>  Dr. Su Hyuk Ko <a href="mailto:KoSH@uthscsa.edu">KoSH@uthscsa.edu</a>
	09/13/24	CRISPR transfection  Immunostaining (1Ab 4C)	Dr. Lizhen Chen <a href="mailto:ChenL7@uthscsa.edu">ChenL7@uthscsa.edu</a>  Dr. Su Hyuk Ko <a href="mailto:KoSH@uthscsa.edu">KoSH@uthscsa.edu</a>
Week 4	09/18/24	Immunostaining continued  Protein extraction for western blot  Genetic cross continued (Genotype confirmation)	Dr. Lizhen Chen <a href="mailto:ChenL7@uthscsa.edu">ChenL7@uthscsa.edu</a>
	09/20/24	Make SDS-PAGE gel for western blot  fluorescence microscopy +ImageJ analysis	Dr. Lizhen Chen <a href="mailto:ChenL7@uthscsa.edu">ChenL7@uthscsa.edu</a>
Week 5	09/25/24	Western blot (gel running, transfer, blocking)	Dr. Lizhen Chen <a href="mailto:ChenL7@uthscsa.edu">ChenL7@uthscsa.edu</a>
	09/27/24	Western blot continued  RNA isolation and reverse transcription	Dr. Lizhen Chen <a href="mailto:ChenL7@uthscsa.edu">ChenL7@uthscsa.edu</a>

<b>Week 6</b>	<b>10/02/24</b>	Real-time PCR and data analyses  Methods used for genomic analyses (RNA-seq, CHIP-seq, ATAC-seq, CLIP-seq)	Dr. Gang Huang <a href="mailto:Huangg1@uthscsa.edu">Huangg1@uthscsa.edu</a> Dr. Lizhen Chen <a href="mailto:ChenL7@uthscsa.edu">ChenL7@uthscsa.edu</a>
	<b>10/04/24</b>	Deep Sequencing core facility tour  Deep sequencing Data Analysis including genome browser and GO-term analyses	Dr. Zhao Lai <a href="mailto:LaiZ@uthscsa.edu">LaiZ@uthscsa.edu</a>  Dr. Zhao Zhang <a href="mailto:ZhangZ3@uthscsa.edu">ZhangZ3@uthscsa.edu</a>