

**INTD 6009 (Module 1 of INTD 5007)  
Advanced Molecular Biology**

**Spring 2017**

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**CLASS DAYS and TIME:** Tuesdays and Thursdays 9:00 am to 10:50 am, First day of class is 1/10/17

**CLASSROOM:** AL&TC 2.213, Note: This room contains a data projector that requires a HDMI connection to your laptop

**COURSE FACULTY:** P. Renee Yew, Ph.D., Course Director

**OFFICE LOCATION and HOURS:** STRF 261.2, by appointment

**EMAIL:** yew@uthscsa.edu

**TELEPHONE:** 210-562-4150

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

#### **COURSE DESCRIPTION AND OBJECTIVES**

This is an 8-week course that represents one-half of the current course of INTD 5007, Advanced Cell and Molecular Biology. This module is focused on Advanced Molecular Biology and may be taken separately as an individual module. Topics will include: The nucleus; DNA structure, replication, damage, repair, recombination, and rearrangements; the nucleolus and RNA processing; microRNAs; transcription, chromatin and epigenetics; protein synthesis and modifications; and proteolysis. This advanced course provides a unique learning experience that prepares the student to evaluate and design new research in the cutting-edge areas of modern cell and molecular biology. The entire course comprises a small-group format in which students interact closely with a group of faculty members who have active research programs. For each topic, faculty will provide students with an overview of the research area. Students and faculty will then jointly discuss key publications that serve to bridge the gap between the student's prior understanding of the field and the state of the art in that research area.

**Pre-requisites** – None

**Semester credit hours** – 2 SCH

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

- Explain the fundamental principles and regulation of molecular biological processes including nuclear organization, chromatin remodeling, DNA replication, DNA damage, DNA repair, DNA recombination, DNA rearrangement, transcription, RNA processing, RNA splicing, mRNA decay, RBP function, translation, microRNAs, protein folding and structure, post-translational modifications, and proteolytic pathways.
- Read an assigned scientific paper on one of the topics listed above and come up with a hypothesis and specific aims on the “next step” based on the topic of the assigned paper.
- Present the hypothesis, specific aims, rationale, and approach of the “next step” based on the topic of the assigned paper.

#### **COURSE ORGANIZATION**

**The main teaching modalities used in this course include:**

- 1) Didactic lectures on specific molecular biology topics with the purpose of conveying important concepts.
- 2) Group discussions of assigned papers with the purpose of discussing the paper results, strengths, and weaknesses

with the goal of achieving the ability to critically read the scientific literature.

**3)** Generation of powerpoint presentations of the student's "next steps" with the purpose of learning to think about a topic and designing experiments to test a novel hypothesis.

**4)** Individual and group presentations of the student's "next step" with the purpose of honing presentations skills and learning to provide constructive criticism to colleagues.

**General class format:** In general, the classes will be divided roughly as 50% didactic lectures and 50% group learning/discussions. For each topic, instructors will provide a lecture with information that will help you to understand the given advanced topic and to help you to understand the assigned paper(s). All topics will include a paper assignment and an expected presentation by students except for the first topics and lectures by Drs. Z. Dave Sharp and Kexin Xu.

1. Students are expected to read all the assigned papers independently and potentially be prepared to discuss the papers at the first class for each instructor. Some instructors may choose to spend some time reviewing the assigned paper as a group prior to the presentations so students will need to be prepared to discuss the assigned paper(s) during the first or second class period as indicated by the instructor. This paper review may involve the students taking turns to explain the figures of the paper as well as potentially explaining the background or conclusions of the paper. Not all instructors will go over the paper in class.
2. Students are expected to come to the second class prepared to present a short powerpoint (~5-8 min) describing a potential "next step" which will include a novel hypothesis, specific aims (usually 2 aims), and experimental procedures for addressing a question related to the topic. Students may be asked to work in groups for their presentations. The powerpoint presentation should include background information, your hypothesis, a clear rationale for your hypothesis, specific aims, experimental procedures, and expected results. Each needs to be sufficiently detailed to understand your ideas.
3. Students also need to e-mail the instructor their powerpoint presentation as part of their written assignment or e-mail a one-page summary of their idea.
4. Instructors may give you special instructions for added assignments. Each instructor will inform the students ahead of time of any special instructions and deadlines for specific assignments. Instructors should not deviate significantly from the format unless they discuss the changes with the course director first so we can inform all students ahead of time. If there is any confusion about the format, an instructor's expectations, or any other potential problems (you have not received the papers or lecture notes), please inform the course director immediately so problems can be addressed.

**Materials** – Laptop for presentations and viewing the lecture notes.

**Access to Course Materials** – General class information, messages from instructors, lecture notes and PDF files of papers will be posted to the Dropbox folder called "INTD 6009-2017" (<https://www.dropbox.com/sh/q94c4nevxcssdr7/AAAFmWA2dQ09S1psIt09yGl8a?dl=0>) in the sub-folder called "2017 Lecture Materials." Each instructor's materials will be located in the folder with their last name and/or may also be sent directly via e-mail if the files are not too large. You can access all up-to-date information about the class in the class Dropbox folder. Please make sure to COPY files from the Dropbox folder or you will permanently remove the files from the shared folder (option-drag on a Mac). In general, the assigned paper(s) for each class will be available approximately one week preceding the scheduled class presentation date. The lecture notes will be available at least one day prior to the first class for each instructor.

**Reading Assignments** – Original papers will be assigned by each instructor at least 1 week in advance of the student presentations.

## **ATTENDANCE**

Attendance and participation are mandatory. One large component of the grading is class participation so if a student misses a class due to sickness, the student needs to inform the instructors and course directors as soon as possible since this may result in an incomplete for the student. Any scheduled absences must be approved by the course director prior to the absence.

## TEXTBOOKS

No required textbooks.

## GRADING POLICIES AND EXAMINATION PROCEDURES

Students will be graded on their participation, their presentations, and their powerpoint presentations or one-page summaries. There are no exams in this course. Instructors will provide their grades for each student along with any comments for improvement and these grades and comments will be e-mailed to each student following their classes. A final grade will be assigned by the course director based on the grades given to the students by each instructor.

### Grading System

#### General grading criteria:

General participation in discussions (40%)	Clear presentation of hypothesis and aims and ability to address questions (50%)	Quality of written assignment (10%)
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#### Approximate Grading Scale:

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**

Course information and instructions will be e-mailed to students. Additionally, students should communicate with the course director via e-mail.

**USE OF RECORDING DEVICES**

Recording devices during the lectures are allowed with the permission of each instructor.

**ELECTRONIC DEVICES**

Electronic devices such as cell phones, computers, tablets, etc. are permitted in class, but we ask that you silence your cell phones during class.

## Class Schedule

### Advanced Molecular Biology, INTD 6009 (2 SCH)

#### Module 1 of INTD 5007, Spring 2017

**Course Director:** P. Renee Yew

**Time:** Tuesday and Thursday, 9:00 to 10:50 am

**Location:** AL&TC 2.213 (Please note: You need a HDMI connection for the projector at the ALTC. If your laptop does not have a HDMI connection, you will need a HDMI adapter.)

Week	Day	Date	Lecture Topic	Instructor	Location
<b>Advanced Molecular Biology INTD 6009 (2 SCH)</b> <b>Day and Time:</b> Tues/Thurs 9-10:50 am					
1	Tues	1/10//17	The nucleus, DNA organization and chromatin, epigenetics, and the nucleolus	Kexin Xu Z. Dave Sharp	AL&TC 2.213
2	Thur	1/12/17	Note: No paper assignment or presentations for the first week		
	Tues	1/17/17	DNA replication, DNA damage, and DNA repair	Alex Bishop	AL&TC 2.213
3	Thur	1/19/17			
	Tues	1/24/17			
4	Thur	1/26/17	DNA recombination and DNA rearrangements	Sang Eun Lee	AL&TC 2.213
	Tues	1/31/17			
5	Thur	2/02/17	Transcription and transcriptional regulation	David Kadosh	AL&TC 2.213
	Tues	2/07/17			
6	Thur	2/9/17	RNA processing, splicing, mRNA decay, RBP function, and translation	Luiz Penalva	AL&TC 2.213
	Tues	2/14/17			
7	Thur	2/16/17	microRNAs	Manjeet Rao	AL&TC 2.213
	Tues	2/21/17			
8	Thur	2/23/17	Protein synthesis, folding, and structure; post-translational modifications	Maria Gaczynska	AL&TC 2.213
	Tues	2/28/17			
9	Thur	3/02/17	Proteolysis: Ubiquitin-dependent proteolysis, the proteasome and other proteolytic pathways	Maria Gaczynska	AL&TC 2.213
	Tues	3/07/17			