CHM379: Biomolecular Chemistry
A Biological Chemistry Laboratory Course

Lectures - Tuesdays and Thursdays, 2:00 pm in LM123
Note: In the first half of the course, Tuesdays will be lab days in LM6
Lab sections - Fridays 9:00-1:00 in LM6

Course content: This is a laboratory course in biological chemistry. Students will perform a complete research project to study the structure/function relationship of a chemically modified protein while learning many of the core techniques in the field. The lectures will discuss the theory behind the techniques and highlight how they are used in modern biological chemistry research and industry. The chemical and biochemical principles learned in earlier courses will be applied, and a basic understanding of organic chemistry will be assumed. This information will serve as a basis for independent research and more advanced courses in biological and biophysical chemistry.

Recommended Text: "Biochemistry" by D. Voet & J. G. Voet, 4th Edition, Wiley 2011. Any other good introductory text, such as "Fundamentals of Biochemistry" by Voet, Voet, & Pratt is also fine.

Lecturers: Prof. Andrew Woolley
awoolley@chem.utoronto.ca
Room 526
Office Hours: 3-4, Tues/Thurs or by appointment

Lab TAs:
Huixin Lu huixin.lu@mail.utoronto.ca
Ryan Woloschuk rywoloschuk@gmail.com
Jaewan Jang roy.jang@mail.utoronto.ca

Grades:	Class test (Feb. 15, in class)	15%	
	Final exam	35%	
	Lab total	50%	
	Formal Lab Report (due April 3rd)		20%
	Lab presentation (Feb. 9 and March 27/29/Apr3/5, best out of 2)		10%
	Lab performance and notebook (due April 3rd)		10%
	Writing exercise (Jan 19th) + paper intro		10%
Late penalty		*10% each day*	

Course Material: Lecture notes will be posted before class on the website. You are responsible for the material covered in both the lectures and the labs. You are required to be prepared for the lab, including any calculations, and understand what you are doing. In addition to the lab manual and text, your resources include other books and journal articles, the web (but be careful!), your classmates, the TAs and Lecturers.

Blackboard: For lecture notes, announcements, handouts, updates, and lab results.

Turnitin: "Normally, students will be required to submit their course essays to Turnitin.com for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the Turnitin.com reference database, where they

will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site".

Schedule for CHM379 – 2018

Wk	Mon.	Tues. 2pm	Thurs. 2 pm	Fri. 9 am to 1 pm
Part I				**Gene Assembly & Protein Prep**
1	Jan. 1		C- Intro to class in LM 123 Then, intro Pipettemen Hand-in sheet; Organize groups	Autoclave LB Prepare Amp plates Prepare agarose gel Set up PCR; Calculations…
2	Jan. 8	Agarose gel	C- Review aa, buffers DNA, restriction enzymes (RE), ligases	PCR cleanup, HiFi assembly Heat shock transformation Writing and research skills
3	Jan. 15	Prepare agarose gel Plan RE digest	C- PCR etc **Set up mini-prep cultures	Mini-prep DNA Quantify RE digests & Agarose gel
4	Jan. 22	C- Sequencing & bioinformatics	C- Protein expression techniques	Check sequences (computer lab) Heat shock of BL21(DE3) Make buffers
5	Jan. 29	SDS gel on cells to check expression	C- Chromatography	Lyse cells, Centrifuge lysate, Run column Set up Dialysis
6	Feb. 5	SDS-PAGE, Quantify	C- Electrophoresis, UV/Vis, Expasy etc.	***Presentation Day#***
7	Feb. 12	C-Review	***Test (Feb. 15)***	Protein cross-linking, Set up Dialysis
	Feb. 19	*Reading week*		
Part II				**Characterization–Staggered***
8	Feb. 26	C- protein structures (CD, Fl)	C- X-ray of proteins	Photoswitching (UV/Vis)
9	Mar. 5	C- NMR of proteins	C- enzyme kinetics	Conformational changes (CD)
10	Mar. 12	C- protein mass spectrometry	C- ligand binding	Inhibition Actitivy (Fluorescence)
11	Mar. 19	C- protein folding	C- protein design & modification	Mass Spectrometry
12	Mar. 26	***Presentation Day***	***Presentation Day***	***Good Friday***
13	Apr. 2	***Presentation Day***	***Presentation Day***	

*You will rotate through these labs, so you may not be doing them in this order.
**You will have to set up the mini-prep cultures the day before your 4 h lab.
#Presentations on Feb. 9th will be in LM128.
C – indicates a lecture in LM123. Labs are in Analest, LM6/7.