

## CHEM 3275 – Biochemistry Techniques

Spring 2017

*revised 3/16/2017*

### Instructors:

Dr. Karen Lewis ([KAL137@txstate.edu](mailto:KAL137@txstate.edu)) CENT 404

Dr. Steven Whitten ([SW50@txstate.edu](mailto:SW50@txstate.edu)) CENT 408B

### Instructional Assistants:

L01 (Tues 8 am – noon): Jose Castro, [jmc243@txstate.edu](mailto:jmc243@txstate.edu)

Nestor Rodriguez, [ndr23@txstate.edu](mailto:ndr23@txstate.edu)

L02 (Tues 2 pm – 6 pm): Chelsea Toner, [cmt116@txstate.edu](mailto:cmt116@txstate.edu)

Samantha Zepeda, [sk1203@txstate.edu](mailto:sk1203@txstate.edu)

L03 (Wed 8 am – noon): Chelsea Toner, [cmt116@txstate.edu](mailto:cmt116@txstate.edu)

Alejandra Moreno, [maa110@txstate.edu](mailto:maa110@txstate.edu)

L04 (Wed 2 pm – 6 pm): Lance English, [english.lance@outlook.com](mailto:english.lance@outlook.com)

Taylor Perrin, [tap75@txstate.edu](mailto:tap75@txstate.edu)

L05 (Thurs 8 am – noon): Jose Castro, [jmc243@txstate.edu](mailto:jmc243@txstate.edu)

Nestor Rodriguez, [ndr23@txstate.edu](mailto:ndr23@txstate.edu)

### Locations

Lectures will be held in Freeman Aquatic 102 (Mondays) and Alkek Library 102 & 148 (Fridays) from 11-11:50 am, unless otherwise noted. All changes will be clearly announced in lecture, lab session, and on TRACS.

All lab sections meet in Chemistry 109.

### Office Hours

Dr. Whitten's office hours are Mon, Wed, and Fri from 9 am – 10 am.

Dr. Lewis' office hours are Mon 8 – 9 am, Tues 3 – 5 pm, and Thurs 9 -11 am.

### Course Description

This course introduces biochemistry majors to the fundamental laboratory techniques used in analytical and physical biochemistry. Weekly experiments will reinforce concepts presented in pre- and co-requisite courses and utilize modern instrumentation. Experimental design, interpretation of results, analysis, and reporting of experimental data will be emphasized.

Prerequisite: CHEM 3375 with a C or better.

### Course Objectives

Upon completion of this course, students will be able to:

1. Calculate concentrations in different units and prepare aqueous solutions.
2. Recognize the causes of various experimental errors and know how to identify, evaluate, and minimize them.
3. Perform successful titrations and calculate/report the experimental results (*i.e.*, concentrations, purity, *etc.*) with appropriate number of significant figures.
4. Isolate a protein from a native source using standard purification techniques.
5. Analyze various biomolecules using a variety of methods, including detection, separation, and characterization techniques.

6. Operate instruments used in biochemical experiments.
7. Use the scientific literature to write an experimental protocol.
8. Properly document laboratory experiments in a notebook.
9. Relay scientific concepts and studies to other scientists and the local community.

### **Required Materials** (for *every lab session*)

- 100 pg duplicate copy laboratory notebook (ISBN 978-1930882744)
- Ball point pen for writing in lab notebook
- an external storage drive (USB type)
- three-ring binder
- closed-toe shoes
- long pants/jeans
- shirt with sleeves
- safety goggles/glasses

### **Course Grades**

Lab Participation/Cooperation/Safety (5 pts each)	60
Pre-Lab Notebook Quiz (15 pts each)	165
In-Lab Notebook (15 pts each)	165
Post-lab Notebook (30 pts each)	330
Methods Section Assignment	50
Outreach Essay (25 pts)	25
Final Exam (lab practical final)	150
<b>TOTAL</b>	<b>900</b>

Grading Scale:	805-900	A
	715-804	B
	625-714	C
	535-624	D

### **Attendance and Tardiness:**

Lecture and lab attendance is **mandatory**.

- Students should arrive on time for lecture and laboratory sessions. Extra time will not be given for the pre-lab notebook quiz.
- Students who are not prepared to begin lab on time may not be able to complete the experiment and will lose credit on their in-lab grade.
- **A laboratory absence** will result in a zero for the in-lab notebook grade, but data may be obtained from your lab partner and used to complete the post-lab notebook assignment for full credit (25 pts).
- **There are no make-up labs.** If you have any conflicts with your current lab section, you should immediately discuss them with Drs. Lewis and Whitten **and** provide a written explanation via email.
- TAs are *not permitted* to extend the laboratory session times or adjust assignment due dates.

### **Laboratory Safety:**

- It is **your responsibility** to observe and follow the departmental laboratory safety policy and all course-specific safety policies. These include following direct instructions from the TA and the instructors.
- Safety glasses must be worn at all times. Safety glasses must be on your eyes the minute you cross the threshold into the laboratory and remain in place throughout the laboratory session.
- All safety violations will be penalized as a deduction in lab participation points.
- Depending on the severity of a safety violation, a student may be given a warning for a first violation.
- Major and/or repeat safety violations may result in a student being asked to leave the laboratory.
- Upon removal from the laboratory as a result of a safety violation, a student may not be given the opportunity to make up the missed experiment(s).

### **Lab Notebook:**

- Your notebook is extremely important for success in this course. It will also serve you as a reference in subsequent biochemistry laboratory courses. **Each student is required to maintain a duplicate page lab notebook** that will contain all pre-lab assignments, sample calculations, procedures to be performed, results, and conclusions of the experiment. See “Laboratory Documentation Guidelines” document for complete details.
- The notebook for each lab experiment will be graded in three portions: pre-lab (via an in-class timed quiz), in-lab, and post-lab, as described in the “Laboratory Documentation Guidelines” document.
- **Pre-Lab Quiz:** A pre-lab quiz will be administered in lecture on Mondays. No make-up quizzes will be given. If you are absent, then your grade for the pre-lab quiz will be zero. Extra time for quizzes will not be given without documented and pre-arranged accommodations (see below).
- **Pre- and In-Lab Grading:** A duplicate copy of the pre- and in-lab notebook pages will be turned in to the TA at the end of the lab session.
- **Post-Lab Grading:** A duplicate copy of the post-lab notebook pages will be turned in to the TA at the beginning of the *next* lab session.

### **Resources**

- The laboratory instructors will maintain a TRACS course website, which will be used for posting course information throughout the semester (including experimental protocols, instructions, and resources) and maintaining grades. You can access TRACS at <https://tracs.txstate.edu/portal> or from the link on the Texas State homepage.
- Students are encouraged to use supplementary materials provided on the course TRACS site as well as materials from CHEM 3380 Analytical Biochemistry and CHEM 3375 Principles of Biochemistry.
- Students should check their Texas State email accounts daily for lab announcements. Copies of each announcement will be posted on TRACS in the email archive.

### **Lab Glassware and Supplies**

- Each student is responsible for proper care of equipment and supplies, including micropipettors.

- Students (as partners) will be assigned a drawer at the beginning of the semester to hold assigned equipment (such as spatulas, tips, and stir bars) and personal items. Students are responsible for returning their items to their assigned drawer and locking it at the end of each lab section.
- Micropipettors, including a P-1000, P-200, and P-20, will be checked out from the TA at the beginning of each laboratory session. These must be returned at the end of each laboratory session. Failure to promptly return all pipettes will result in loss of Lab Participation/Safety points. If repair or replacement of pipettes is necessary due to misuse, the students responsible will be charged.
- On occasion, specialized equipment will need to be checked out from the stockroom at the beginning of lab, using your Texas State ID or driver's license as collateral. It is **your responsibility** to return such equipment in a complete, unbroken, and properly cleaned condition.
- Replacement of lost or damaged supplies, glassware, or equipment will be charged to both lab partners (*i.e.* 50% per partner) if the responsible party cannot be identified. The balance(s) will be paid through Texas State University Business Services. Unpaid balances may prevent registration and/or graduation.

### **Honor Code**

- **No collaboration** is permitted on graded work (including tests, quizzes, and post-labs.).
- Lab partners will perform the experiment and collect data together. However, collaborations are **not** allowed on discussions, conclusions, or written reports. This policy is not intended to discourage students from studying together or working together to prepare for lab or perform the experiments.
- This policy explicitly forbids copying or paraphrasing the work of others, including a text, journal article, another student's lab report, or any site on the Internet. All outside sources must be clearly acknowledged. *Referencing or otherwise acknowledging the source of text (even a portion of a single sentence) that has been **copied directly or closely paraphrased is still considered plagiarism**.* A complete description of the Texas State Honor Code is at <http://www.txstate.edu/effective/upps/upps-07-10-01.html>.  
If you need additional clarification, see Drs. Lewis and Whitten.
- Violation of the Texas State Honor Code will result in academic penalties at the instructors' discretion, up to and including failure in the course.

### **Professionalism and Respect**

The University and Drs. Lewis and Whitten are committed to an educational community in which each individual is respected, appreciated, and valued. Class rosters are provided with the student's legal name. All requests to address you by an alternate name, pronunciation, and/or gender pronoun will be honored. Please advise us (either in person or by email) of this preference early in the semester.

### **Special Needs**

If you are a student with a disability who will require an accommodation(s) to participate in this course, please contact both Drs. Lewis and Whitten as soon as possible. You will be asked to provide documentation from the Office of Disability Services. Failure to contact us in a timely manner may delay your accommodations.

### **Drop Policy**

The automatic "W" deadline is March 28, 2017 at 11:59 pm. After March 28, 2017, students cannot drop any course. Students may *withdraw* from the University (*i.e.*, drop all courses, and go to zero credit hours for the current semester) by April 27, 2017. Note that withdrawal from the University is not the same as dropping a course.

## JANUARY 2017

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17 Check-In	18 Check-In	19 Check-In	20 Lewis Lecture ALK102	21
22	23 Lewis Lecture FAB102	24 Lab 1 Pipette/ Solutions	25 Lab 1 Pipette/ Solutions	26 Lab 1 Pipette/ Solutions	27 Lewis Lecture FAB102	28
29	30 Lewis Lecture FAB102	31 Lab 2 Amino Acid #1				

## FEBRUARY 2017

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1 Lab 2 Amino Acid #1	2 Lab 2 Amino Acid #1	3 Lewis Lecture ALK102	4
5	6 Lewis Lecture FAB102	7 Lab 3 Amino Acid #2	8 Lab 3 Amino Acid #2	9 Lab 3 Amino Acid #2	10 Lewis Lecture ALK102	11
12	13 Whitten Lecture FAB102	14 Lab 4 LDH Extraction	15 Lab 4 LDH Extraction	16 Lab 4 LDH Extraction	17 Whitten Lecture ALK102	18
19	20 Whitten Lecture FAB102	21 Lab 5 LDH Affinity	22 Lab 5 LDH Affinity	23 Lab 5 LDH Affinity	24 Whitten Lecture ALK102	25
26	27 Whitten Lecture FAB102	28 Lab 6 Bradford /SDS-PAGE				

## MARCH 2017

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1 Lab 6 Bradford /SDS-PAGE	2 Lab 6 Bradford /SDS-PAGE	3 Whitten Lecture FAB102	4
5	6 Whitten Lecture FAB102	7 Lab 7 SDS-PAGE / Activity	8 Lab 7 SDS-PAGE / Activity	9 Lab 7 SDS-PAGE / Activity	10 Whitten Lecture ALK102	11
12	13	14	15	16	17	18
19	20 Lewis Lecture FAB102	21 Lab 8 Lipid Extraction	22 Lab 8 Lipid Extraction	23 Lab 8 Lipid Extraction	24 Lewis Lecture ALK102	25
26	27 Lewis Lecture FAB102	28 Lab 9 LDH Kinetics	29 Lab 9 LDH Kinetics	30 Lab 9 LDH Kinetics	31 Lewis Lecture ALK102	

## APRIL 2017

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3 Lewis Lecture FAB102	4 Lab 10/11 Melt DNA/ Protein	5 Lab 10/11 Melt DNA/ Protein	6 Lab 10/11 Melt DNA/ Protein	7 Lewis Lecture ALK102	8
9	10 Lewis Lecture FAB102	11 Lab 10/11 Melt DNA/ Protein	12 Lab 10/11 Melt DNA/ Protein	13 Lab 10/11 Melt DNA/ Protein	14 Lewis Lecture ALK102	15
16 STAAR Outreach Week	17 Lewis Lecture FAB102	18 SigmaPlot Calcula- tions	19 SigmaPlot Calcula- tions	20 SigmaPlot Calcula- tions	21 No lecture	22
23	24 Whitten Lecture FAB102	25 Final Practical Exam	26 Final Practical Exam	27 Final Practical Exam	28 no class/ Outreach Due	29

## MAY 2017

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1 no class	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

## IMPORTANT DATES

January 17	First day of class
January 17	Laboratories begin
March 12-19	Spring Break
March 28	Automatic W deadline
April 20	Withdrawal deadline
May 2	Last day of class

