

**BCHM 495 Introduction to Biochemistry Laboratory Syllabus
Spring 2017**

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LAB TIME AND PLACE:

Thursday, BCHM 112, 1:30pm – 4:30pm.
Credit Hours: 1

COURSE OBJECTIVES

BCHM 49500 is an entry-level laboratory course to help freshmen students become interested and excited about scientific research, and at the same time, gain the skills necessary to become better prepared for undergraduate research opportunities. In this laboratory, you will perform real-world experiments to identify single base-pair changes in a DNA sequence that can change a protein-protein interaction. During this process, you will learn common laboratory skills such as pipetting, centrifugation, and sterile technique. You will also learn how to display and interpret scientific results in written form.

LEARNING OUTCOMES

Overall Course Objective: Students will gain skills that allow them to be better prepared for undergraduate research opportunities and stimulate interest in scientific research.

At the conclusion of this course, students will be able to:

- Demonstrate common laboratory skills such as sterile technique, micropipetting, centrifugation, plasmid DNA isolation, and culturing bacteria and yeast.
- Define commonly used laboratory terminology and understand and execute protocols that contain these terms.
- Display and interpret scientific methods and results in written form.
- Identify positive and negative controls for an experiment.
- Write an appropriate aim for an experiment.
- Analyze DNA and protein sequence information.

TEXTBOOK

There is no recommended textbook for this course. Links to appropriate web resources for additional reading will be provided via the Purdue University Blackboard Learn site at: <http://www.itap.purdue.edu/learning/tools/blackboard/>

COMPUTERS

Many lab activities will require the use of a laptop or tablet computer. Tablets will be provided in the lab for your use.

BLACKBOARD

The syllabus for the course, lecture notes, and grading keys for quizzes and exams will be available via the Purdue University Blackboard Learn site at:
<http://www.itap.purdue.edu/learning/tools/blackboard/>

ASSESSMENT

There will be no midterm or final exam for this laboratory course.

The grading for this course will be as follows:

Lab Notebooks (13 weeks @ 5 points)	65 points
Pre-lab Quizzes (13 weeks @ 5 points)	65 points
Assignment 1 (Methods)	50 points
Assignment 2 (Results)	50 points
Assignment 3 (Abstract)	50 points
Final Assignment (Research paper)	200 points
Participation	20 points
Total points possible	500 points

The cutoff values for letter grades are as follows:

400 points	A
350 points	B
300 points	C
250 points	D
249 points and below	F

Missing a lab will result in a grade of 0 being recorded for that week's lab notebook unless documented justification for the absence is presented. Any request to be excused from a lab must include official documentation (doctor's note, request from academic advisor, etc) explaining why the lab was or will be missed.

If you have any disagreements with the way any of your notebooks, quizzes or assignments have been graded, please consult the grading rubric and then discuss them with the laboratory TA. In the event this does not resolve your concerns, please take them up with the instructor. Requests for re-grades must be submitted no later than the end of the second lab period after the graded pre-lab quiz, lab notebook or assignment has been returned.

Late assignments will be penalized at the rate of 5 points per day.

EXTRA CREDIT

There will be no opportunity for extra credit.

OBTAINING EXTRA HELP

Dr. Weake will be available to answer your questions during the laboratory, immediately after laboratory, or by appointment (arranged in lab or by e-mail). Alternatively, you can submit questions by e-mail that can be answered in lab or by return e-mail.

ACADEMIC MISCONDUCT

Academic misconduct of any kind will not be tolerated in any course offered by the Department of Biochemistry. Student resources related to academic integrity can also be found online at www.purdue.edu/odos/aboutodos/academicintegrity.php. You should familiarize yourself with these policies, particularly if you are new to US academic institutions. All apparent violations of these policies will be referred to the Office of the Dean of Students (ODOS).

If the ODOS establishes that you have committed academic misconduct, the **minimal** response will be for your instructor to assign you a zero for the work in question; however, the **standard** response will be for you to receive a failing course grade and have a permanent record of the violation kept on file at the ODOS. These sanctions will be applied at the sole discretion of your instructor. Particularly egregious examples of academic misconduct or repeat offenses will result in you being expelled from the university by the ODOS.

To provide you with an unambiguous definition of academic misconduct, the following text has been excerpted from "Academic Integrity: A Guide for Students", written by Stephen Akers, Ph.D., Executive Associate Dean of Students (1995, Revised 1999, 2003), and published by the Office of the Dean of Students in cooperation with Purdue Student Government, Schleman Hall of Student Services, Room 207, 475 Stadium Mall Drive West Lafayette, IN 47907-2050.

"Purdue prohibits "dishonesty in connection with any University activity. Cheating, plagiarism, or knowingly furnishing false information to the University are examples of dishonesty." [Part 5, Section III-B-2-a, [University Regulations](#)] Furthermore, the University Senate has stipulated that "the commitment of acts of cheating, lying, and deceit in any of their diverse forms (such as the use of substitutes for taking examinations, the use of illegal cribs, plagiarism, and copying during examinations) is dishonest and must not be tolerated. Moreover, knowingly to aid and abet, directly or indirectly, other parties in committing dishonest acts is in itself dishonest." [University Senate Document 72-18, December 15, 1972] More specifically, the following are a few examples of academic dishonesty which have been discovered at Purdue University.

- substituting on an exam for another student
- substituting in a course for another student
- paying someone else to write a paper and submitting it as one's own work
- giving or receiving answers by use of signals during an exam
- copying with or without the other person's knowledge during an exam
- doing class assignments for someone else
- plagiarizing published material, class assignments, or lab reports
- turning in a paper that has been purchased from a commercial research firm or obtained from the internet
- padding items of a bibliography
- obtaining an unauthorized copy of a test in advance of its scheduled administration
- using unauthorized notes during an exam
- collaborating with other students on assignments when it is not allowed
- obtaining a test from the exam site, completing and submitting it later
- altering answers on a scored test and submitting it for a regrade
- accessing and altering grade records

- stealing class assignments from other students and submitting them as one's own
- fabricating data
- destroying or stealing the work of other students

Plagiarism is a special kind of academic dishonesty in which one person steals another person's ideas or words and falsely presents them as the plagiarist's own product. This is most likely to occur in the following ways:

- using the exact language of someone else without the use of quotation marks and without giving proper credit to the author
- presenting the sequence of ideas or arranging the material of someone else even though such is expressed in one's own words, without giving appropriate acknowledgment
- submitting a document written by someone else but representing it as one's own"

CLASS ATTENDANCE

In accordance with University policy, you are expected to attend every scheduled lab. If you have a valid reason for missing class such as a University-sponsored activity, religious observances, illness, or family emergency, the instructor or TA will assist you in obtaining information and materials you may have missed. Students who skip lab without a valid excuse should not expect the instructor or TA to supply lab notes or provide special help. For the official university policy, see: www.purdue.edu/odos/services/classabsence.php and <http://www.purdue.edu/univregs/academicprocedures/classes.html>

EMERGENCY PREPAREDNESS

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. To get information about changes in this course consult the class Blackboard Learn site or e-mail or phone the instructor.

ON-LINE COURSE EVALUATIONS

During the last two weeks of the semester, you will be provided an opportunity to evaluate this course and your instructor(s). To this end, Purdue has transitioned to online course evaluations. On Monday of the fifteenth week of classes, you will receive an official email from evaluation administrators with a link to the online evaluation site. You will have two weeks to complete this evaluation. Your participation in this evaluation is an integral part of this course. Your feedback is vital to improving education at Purdue University. I strongly urge you to participate in the evaluation system.

NON-DISCRIMINATION POLICY STATEMENT

Purdue University's non-discrimination policy will be upheld in this classroom. Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life.

Purdue University views, evaluates, and treats all persons in any University related activity or circumstance in which they may be involved, solely as individuals on the basis of their own personal abilities, qualifications, and other relevant characteristics.

LAB SAFETY & PPE

Detailed information can be found in Appendix I of this syllabus.

The dress code for lab activities will follow OSHA guidelines, and is for the safety of all students. A lab coat is required for all lab activities. Please bring one to class. Closed-toe shoes are required at all times in the lab, and the hemlines of shorts, skirts and dresses must be no higher than knee-length. If you do not wish to wear the safety goggles provided in the lab, you must bring your own. Failure to adhere to the dress code will result in a grade penalty for the first occurrence, and you may be asked to leave the lab for further occurrences.

There will be no eating, drinking or application of cosmetics in the laboratory at any time.

CELL PHONES

Cell phones may not be used in the laboratory at any time. Please leave them in your bag for the duration of the laboratory.

LABORATORY SCHEDULE

Lab	Date	Topic	Pre-Quiz	Assignment*
* Assignment dates may change with notice.				
1	1/12	Micropipetting Exercise	1	
2	1/19	Sterile Technique	2	
3	1/26	Isolation of plasmid DNA from <i>E. coli</i>	3	
4	2/2	Transformation of Control Plasmids into Yeast	4	
5	2/9	Patching Yeast Transformations – control plasmids	5	#1 Methods
6	2/16	Replica Plating Controls	6	
7	2/23	Transformation of Mutant Allele Library into Yeast	7	#2 Results
8	3/2	Patching Out Mutant Allele Library	8	
9	3/9	Replica Plating Mutant Allele Library	9	#3 Abstract
X	3/13 – 3/18	Spring break		no lab
10	3/23	Isolating Mutant Plasmids from Yeast Cells	10	
11	3/30	Transform Mutant Plasmid into <i>E. coli</i>	11	
12	4/6	Isolation of plasmid DNA from bacteria and DNA sequence analysis	12	
13	4/13	Analysis of DNA sequence data	13	#4 Final Assign.
14	4/20	Analysis/Report preparation	No Quiz	
15	4/27	Assignment Feedback Session	No Quiz	
X	5/1 – 5/6	EXAM WEEK		no lab

Due Dates for Assignments:

Assignment #1 Methods (2 weeks)	2/23 (THURSDAY)
Assignment #2 Results (2 weeks)	3/9 (THURSDAY)
Assignment #3 Abstract (3 weeks)	3/30 (THURSDAY)
Final Assignment (first revision) 50 points	4/24 (MONDAY)
Final Assignment (second revision) 150 points	5/4 (THURSDAY)

APPENDIX I: Department of Biochemistry Teaching Laboratory (BCHM 112) Safety Rules

1. Approved safety goggles (with sideguards) must be worn by all persons (faculty/instructors, teaching assistants and students) in the laboratory any time when you are instructed to do so. If you do not have safety goggles, they will be provided to you.
2. Lab coats must be worn by all persons (faculty/instructors, teaching assistants and students) in the laboratory any time there is work in progress by anyone. Lab coats may be purchased at the University Book Store, or Follet's. You will not be permitted to take part in any lab activity without your lab coat. All PPE should be removed before you leave the lab.
3. Eating, chewing gum, and/or drinking in the laboratory is strictly forbidden.
4. Many laboratory chemicals/reagents are toxic. If instructed to smell reagents, do so with great caution, and NEVER put your nose over the bottle! Avoid looking into the mouth of any reaction vessel or test tube; instead, view from the side. Never point a test tube at anyone.
5. Proper attire must be worn at all times. Closed-toe shoes are required at all times in the lab. The hemlines of shorts, skirts and dresses must be no higher than knee-length. Failure to adhere to the dress code will result in a grade penalty for the first occurrence, and you may be asked to leave the lab for further occurrences.
6. Hair that reaches the shoulders or longer must be tied back. Caps or hats must not be worn.
7. No one will perform any unauthorized experiments, nor will students work in the lab alone, or outside of regularly scheduled hours.
8. Keep a clean working area. Books, book bags, jackets etc. and paper should not clutter the workbench. Keep chairs and book bags recessed under cabinets when not in use.
9. Do not leave the lab until you have cleaned up your work area and returned supplies and equipment to the appropriate area if necessary.
10. Follow the guidelines of your instructor or teaching assistant when handling any hazardous materials. Be aware of the safety labeling on containers to identify risks associated with the materials.
11. Follow the guidelines of your instructor or teaching assistant for waste disposal. Dispose of the excess chemicals in the proper waste container, as indicated by the lab instructor or teaching assistant.
12. When pouring something out of a reagent bottle, always READ THE LABEL TWICE to be certain that you are using the correct material.
13. Label all chemical containers and test tubes before use to avoid mix-ups.
14. If you spill something, **clean it up (GET HELP WITH HAZARDOUS MATERIALS)!** Wash your hands immediately after skin contact with any chemical reagent. Also wash them after lab. If liquids drip down the side of the bottle, while pouring, wash the bottle off.
15. NEVER return excess chemicals to the reagent bottle.



Sample Warning Label

Health

- 4 Extreme hazard—avoid contact or breathing vapor
- 3 Severe hazard—use special clothing and masks
- 2 Hazardous—use masks or special ventilation
- 1 Lightly hazardous—irritating
- 0 Normal material

Flammability

- 4 Extremely dangerous fire and explosion hazard—below 73° F
- 3 Fire and explosion hazard at normal temps—below 100° F
- 2 Will burn at temps above 100° F
- 1 Will burn at temps above 200° F
- 0 Will not burn

Special Notice

- OXY**—Oxidizing agent
- ACID**—Reacts violently with alkalis
- ALK**—Alkali—reacts violently with acids
- COR**—Corrosive
- W**—Use no water
- P**—Polymerizes
- Radioactive

Reactivity

- 4 Extreme hazard—vacate area in case of fire
- 3 Severe explosion hazard
- 2 Violent chemical change possible
- 1 Unstable if heated
- 0 Normally stable



16. Exercise care when handling glass.
 - a. Do not use broken or chipped glassware.
 - b. Do not leave pipettes sticking out of bottles, flasks or beakers.
 - c. Do not attempt to remove stoppers on glass tubing by force.
 - d. Hot glass must be handled with heat-resistant gloves, and any container containing heated materials must remain vented and be handled with extreme caution.
17. Do not operate centrifuges without supervision from instructor or teaching assistant.

GENERAL SAFETY AND FIRST AID

18. Aisles and exit routes must not be obstructed in any way. Therefore, keep the stools pushed under or next to the bench. Keep book bags and other personal items where they will not be an obstruction hazard.
19. Report all accidents of any type to your instructor immediately. This includes electrical shocks, chemical spills, and bodily exposure to chemicals, biologics and all other types of exposures and/or injuries.
 - a. The instructor, in consultation with the teaching lab coordinator, if necessary, will evaluate the exposure, counsel the student, and treat the exposure as deemed appropriate.
 - b. If deemed necessary, the student will be referred to PUSH for consultation/medical treatment.
 - c. An Incident Report Form must be completed for all exposures and/or injuries that occur in the teaching lab (BCHM 112) and a copy provided to the student and teaching lab coordinator.
 - d. In the case of ANY incident resulting in injury to a student, the student is advised to receive medical attention from PUSH. Department of Biochemistry lab personnel are not medical professionals, and medical opinions can only be obtained from PUSH.
20. An eyewash station and safety shower are located next to the sink on the north end of the lab. These should be used in the event of exposure of the eyes to hazardous materials or skin exposure to hazardous materials that cannot be managed using a faucet at the sink. Do not hesitate to use these if an exposure to hazardous material has occurred.
21. A first aid cabinet is located in the laboratory. Notify the instructor when items are used so supplies may be replaced.
22. In the case of fire in the lab, immediately notify the instructor or teaching assistant and use the RACE acronym:
 - a. REMOVE anyone from danger.
 - b. ALARM – activate the fire alarm first. Then call 911.
 - c. CONTAIN – contain the fire, close doors and windows etc. when leaving the area.
 - d. EXTINGUISH – Only if you have been trained in its use *and* it is safe for you to do so, use the fire extinguisher to control the fire.

NOTE: There is a carbon dioxide fire extinguisher in the lab to the right of the whiteboard. Do not attempt to use it unless you have been trained in its use. It may be used on liquid fires and electrical fires only.

23. EVACUATION PROCEDURES

The building alarm will sound inside the building in the case of fire, or other emergency that requires your evacuation.

- a. If this alarm sounds, you must evacuate the building immediately.

- b. Shut off any equipment that you were using, remove personal protective equipment, gather your personal items if the situation permits and leave immediately through the main exit onto South University Street.
- c. Proceed to the emergency assembly area outside NLSN. Notify your instructor if you notice that one of your lab colleagues is no longer with your group. Do not leave this area without consulting directly with your instructor.

24. SHELTER-IN-PLACE PROCEDURES

The outdoor all-hazards alarm will sound if you need to shelter in place due to inclement weather (including tornadoes), hazardous materials release, active shooter or other civil disturbance.

- a. To shelter-in-place, follow the directions of your instructor.
- b. Do not leave the building unless you are cleared to do so by your instructor.

**Department of Biochemistry Teaching Laboratory (BCHM 112)
Safety Rules**

Student acknowledgement and declaration of cooperation.

Course: _____

Semester: _____

Instructor: _____

I have read the safety rules for the Department of Biochemistry Teaching Laboratory (BCHM 112), understand all of the procedures, and agree to abide by them. I understand that failure to comply with safety procedures could result in the suspension of my laboratory privileges or disenrollment from the course.

Signed: _____

Date: _____

