

BIOCHEMISTRY 102:

**INTRODUCTORY
BIOCHEMISTRY
LABORATORY**

Winter Quarter 2003

UNIVERSITY OF CALIFORNIA, RIVERSIDE

Department of Biochemistry

Instructor:

Richard J. Debus

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**BIOCHEMISTRY 102, INTRODUCTORY BIOCHEMISTRY LABORATORY,
Winter Quarter 2003****A. Instructors and Teaching Assistants:****Instructor**

Professor: Richard J. Debus
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Ext x8-3483 (or 787-3483)
Email richard.debus@ucr.edu
Hours: Monday, 12:10 - 1:00 PM
Wednesday, 12:10 - 1:00 PM

Teaching Assistants

TA: Melissa Patrick (Section 1)
Office: 1415 Boyce Hall
Ext x 8-3687
Email: mpatrick79@yahoo.com
Hours: Thursday/Friday 3:30-4:30 PM

TA: Matthew Christians
Office: 1415 Boyce Hall
Ext
Email: mcsqd99@hotmail.com
Hours: Tuesday/Thursday 10:00-11:00 AM

TA: Shane Hall
Office: 1415 Boyce Hall
Ext
Email: shaneahall@aol.com
Hours: Wednesday 10-11 AM and 1-2 PM

TA:
Office:
Ext
Email:
Hours:

B. General Information

Biochemistry 102 lectures will be held on Monday and Wednesday from 11:00 AM – noon in Room 1476 Boyce Hall. For Section 1, four-hour laboratory sessions will be held on Tuesday and Thursday, 1:10-5:00 PM. For Section 2, four-hour laboratory sessions will be held on Monday and Friday, 1:10-5:00 PM. All laboratory sessions will be held in room 2404 Boyce Hall

To partially offset the cost of consumable supplies associated with the laboratory, a course fee of \$40 is assessed for enrollment in this course.

C. Course Prerequisites

Biochemistry 102 may be taken by students who have completed Biochemistry 110A with a grade of “C–“ or better, Biochemistry 100 with a grade of “C–“ or better, or who have written consent of the coordinating instructor.

D. Required Text

Introductory Biochemistry Laboratory Manual The printed material for this manual can be purchased from Printing and Reprographics (next to bookstore).

E. Recommended Text (Those on reserve in the Science Library, see next section)**F. References on 2-hour Reserve in the Science Library**

Robynt, J. F. and White, B. J. (1990) *Biochemical Techniques: Theory and Practice* Waveland Press, Inc., New York.

Scopes, R. K. (1994) *Protein Purification: Principles and Practice* Springer-Verlag, New York.

Supplementary reading material listed at the end of some experiments will be on reserve in 3 ring binders.

G. Grade Determination

The course grade for BCH-102 will be determined in accordance with the following point distribution:

	Points
Flowcharts (due at start of laboratory period) (5 points/lab period for 15 laboratory periods)	75
Laboratory Notebooks (examined at end of laboratory period) (10 points/lab period for 15 laboratory periods)	150
Laboratory Reports (30 points/lab period for 15 laboratory periods)	450
Midterm 1	70
Midterm 2	70
Final Examination	210
Total	1025

H. Pre-Laboratory Preparation

All students must prepare **BEFORE ARRIVING IN THE LABORATORY**. The experiments are designed so that they can be carried out – with proper advance planning – within the four-hour laboratory periods. It is expected that students will have a fundamental understanding of the theory and practices pertaining to the experiment **before** entering the laboratory to conduct these experiments.

- (1) **Prior to arriving in the laboratory, students must individually prepare a flow chart for the work to be conducted that day.** This flow-chart should be limited to a single page and will be examined and graded by the instructor or TA's at the start of the laboratory period. Students will not be permitted to begin the experiment without a proper flow-chart.
- (2) **Biochemical experiments often employ toxic chemicals.** For the health and safety of all students, the experimental protocols must be studied and the day's activities planned in advance. If it becomes obvious that a student is ill-prepared, he or she will not be permitted to continue the experiment.

I. Laboratory Notebook

Every bench researcher in the biological sciences must develop the habit of maintaining a laboratory notebook that faithfully records the research efforts and results of the investigator.

- (1) Although students will work in pairs for all BCH 102 experiments, each student must maintain a permanently bound laboratory notebook with carbon paper duplication. The notebook must be maintained in ink with carbon copies submitted with the laboratory report. The notebook must be available to the instructor and TA's at any time during the laboratory period for checking the progress of the experiment. **The notebook will be examined and graded at the end of each laboratory period.**
- (2) Each pair of students is responsible jointly for carrying out the experiments, but notebooks are to be kept individually. The notebooks should be identical only in the actual data that is reported. Any other information contained in the notebooks should represent the personal effort of the individual student.
- (3) The notebook should furnish a clear record of all procedures, data, and observations made during the experiment. Any information that may be needed in the future should be recorded immediately and never be left to memory. It is NEVER acceptable to record

data on separate pieces of papers, brown paper towels, etc., for transfer to the notebook at a later time.

- (4) The time, day, month, and year must be recorded for each item recorded in the laboratory notebook. Conscientious recording of times and dates will allow future determination of time elapsed during parts of the experiment. Such information is often later found to be crucial.
- (5) Procedures should be described fully **ONLY** if a reference to a laboratory protocol, text, journal article, or another notebook page will not suffice. However, **all additions, corrections, or deviations from the procedures cited MUST be described in full.** If the method of data analysis is changed during the course of the experiment, the record should show clearly which analyses were made by the old and new methods.
- (6) The experimental observations and data should be concisely and clearly recorded. The **actual data** should be recorded, not merely values obtained after calculations are made. If errors are made, these should be crossed out with a single line and the corrections should be noted nearby. If annotations are added to the notebook at a later date, these should be dated as well.

J. Laboratory Reports

The laboratory report covering each scheduled laboratory meeting is worth 30 points. Thus, laboratory reports for a one-period experiment will be worth 30 points, and the nine-period protein purification/analysis laboratory will be worth 270 points. For those experiments with an “unknown” or “quantitative” component, a proportion of the total points for that experiment will be allocated to the accuracy or correctness of the final answer.

- (1) Although students will work in pairs for all experiments, **each student must turn in an individual laboratory report, written by himself or herself.** These reports should be clearly written in ink, typed, or printed on 8.5 x 11” paper and be clear and legible. If mistakes are made, neatly cross them out and enter the corrections nearby. Reports should be written in the third person (e.g., do not use “I” or “we”). **STAPLE** a Title Page to the top of the report and **STAPLE** the accompanying graphs, tables, and laboratory notebook sheets to the back. **If the report is not clearly presented, the teaching assistant, with permission of the instructor, may return the report without grading it.**

- (2) Each laboratory report should consist of:
- Title Page** - A title page for each experiment is **required** and should state the title of the experiment, the name of the student, the dates of the laboratory periods covered, the names of the laboratory partners, and the date that the laboratory report is due.
 - Objectives** - Statement of the point of the experiment - in no more than two sentences.
 - Procedures** - For Experiments 1-6: Put only changes in the protocol in this section. DO NOT recapitulate the laboratory protocol. For Experiment 8: Give clear one-paragraph summaries of the overall procedures employed for each of the two primary parts of this experiment.
 - Results** - This section should summarize your observations presented in the form of graphs, calculations, tables, etc.
 - Discussion** - (Limited to only one page per experiment for experiments 1 - 6 and four pages for experiment 8). **Evaluate** your data. Explain what you observed and also *why* you think the data were as observed. Do not restate procedures! **List possible sites of error**. Whenever possible demonstrate your understanding of the theory behind the experiment. **Support** your results (e.g.: "Using the linear portion of the Absorbance vs. Concentration graph to calculate the slope, it was determined that...".)
- (3) For some experiments a proportion of the total points of the laboratory write-up will be allocated for either a "quantitative component" or an "unknown". These points will be indicated in this manual in the appropriate section of the experimental protocol.
- (4) The laboratory reports will be due *at the beginning of lab*, according to the schedule listed below. In general, there is approximately a seven day interval from time of completion of the experiment until when the report is due. **Two points per week-day per laboratory period covered will be deducted for late laboratory reports**, up to a maximum of 50% of the total points for the experiment (*i.e.*, 2 points will be deducted per day for experiments 1-6 up to a maximum of 15 points and 16 points per day will be deducted for experiment 8, up to a maximum of 135 points). Questions regarding grading of lab reports should be addressed to the appropriate TA **within five days after the report is returned**.

- (5) If any laboratory report is not completed and turned in by the end of the quarter, the student may at the discretion of the instructors receive an **Incomplete** for the course; alternatively a “zero” for the missing laboratory report will be recorded and the final grade determined accordingly.

K. Midterms

There will be two midterms. These cover specific lectures and experiments (see schedule).

K. Final Examination

The final examination will be administered on Monday, March 17, in Room 1471 Boyce Hall from 3 – 6 AM. The final examination will be written and comprehensive. It will cover the concepts and practical laboratory experience taught in the lectures and the experiments for the entire quarter.

L. Biochemistry Department Policy on Academic Conduct:

The vast majority of students enrolled in Biochemistry courses behave in a manner characterized by honesty and integrity. Unfortunately, the actions of a few students have made it necessary to state explicitly certain rules and policies which will minimize academic misconduct or cheating. The points below are not intended to be a comprehensive list of what is or is not acceptable. The instructor's best guide is to assume that if a student appears to be cheating, that is probably the case. Thus, the student's best guide and **responsibility** is to avoid the appearance of misconduct.

- (1) During quizzes and examinations, all backpacks and other personal belongings will be placed at the front or back of the room or in the compartment under your laboratory bench. Accessibility of notes, books, or any other written material other than the examination itself is unacceptable and constitutes a form of cheating. Any such material will be surrendered by the student at the time that it is found. **Talking to another student for any reason or looking at the work of another student during a quiz or examination is also unacceptable.**
- (2) Permission to leave the room will not be given during quizzes or examinations. During final examinations such permission may be given by the teaching assistant or instructor under conditions decided upon by the instructor.

- (3) There will be active continuing proctoring of all examinations and quizzes with a member of the faculty and teaching assistants present all of the time.
- (4) **Written work done outside the classroom and turned in for a grade must be the exclusive work of the individual student.** For example, laboratory data gathered by teams may be shared but each student **MUST** create her or his own graphs and write his or her own report.
- (5) At least one third of all quizzes and examinations will be photocopied after grading and before returning to the students. Subsequent alterations will result in a zero for the piece of work (*i.e.*, quiz, exam or laboratory report).
- (6) Following any incident of apparent academic misconduct both the faculty member and the student involved may prepare written accounts of the incident to be placed in the student's file. These should be brought to the attention of the departmental chair, with whom lies the responsibility of acquainting both parties of the due process to be followed should there be a disagreement about the facts.
- (7) It should be self-evident that honest students should not tolerate cheating and should notify an instructor or teaching assistant if they observe such behavior.
- (8) One consequence of misconduct will be a grade of zero on the examination, quiz or other piece of work in question.

M Safety Precautions In The Biochemistry Laboratory

a. Health Emergencies

The Student Health Service, located in the Student Center (**Ext. 8-3031**), is open five (5) days per week, Monday through Thursday, between the hours of 8:00 AM and 5:30 PM and Friday between 8:00 AM and 5:00 PM during the academic year when classes are in session. Emergency treatment is available for ill or injured students and University employees covered under Worker's Compensation. Injured students should be brought directly to the facility if at all possible.

For all medical emergencies on campus (24 hours a day, 7 days a week) in which the victim cannot be transported to the Student Health Service, call **8-9-911** from campus phones or

campus pay phones to alert UCR Public Safety. The dispatcher will request information necessary to respond appropriately (e.g., ambulance, fire, police, paramedics).

After hours and on weekends, the Emergency Rooms at Riverside Community Hospital (788-3200), Riverside County Regional Medical Center (486-5650), Parkview Community Hospital (688-8312) or the Riverside Medical Clinic Urgent Care Center (782-3789) may be utilized for services when the ill or injured person is ambulatory. The Student Health Service is primarily an out-patient facility and is not equipped to handle major medical trauma.

All INJURIES, no matter how minor, should be reported to the Professor and/or Teaching Assistants Immediately.

NOTE: The student laboratory and the Biochemistry Department Library have copies of "Prudent Practices of Handling Hazardous Chemicals in Laboratories". If you have any questions regarding the safe handling of any biochemical, consult your Instructor or TAs.

b. Disposal of Solutions:

In most cases the solutions used during the laboratory can be disposed of as directed by laboratory personnel at the end of the period. Any volatile organic solvents should be placed in the hood as directed. Laboratory personnel will then dispose of these solvents.