

Principles and Techniques of Practical Biochemistry
Biol 4670/Chem 4670/Biol 6670/Chem 6670
Fall 2014

Modern biochemistry is an interdisciplinary science that integrates systematically the principles of mathematics, physics, chemistry and biology. Its aim is to dissect and understand the basic principles and properties of life processes by correlating at the molecular level the structure with the function of molecules. It plays a universal role in modern research enterprises in academic, industrial, medical and governmental settings. Modern advances in biochemistry have benefited medicine, industry, agriculture, pharmaceuticals, and the food and drink industries.

Instructor: Dr. Giovanni Gadda

Teaching Assistant: Mr. Dan Su

Class Location & Schedule: Classroom South, TR 9:30-10:45 AM

Office Hours: Tuesday 10:45-11:15 AM, only by email appointment. The instructor will be available to meet with students during office hours, please send email ahead of time to schedule an appointment. Students are required to bring their lecture notes.

Prerequisites: Grade of B or higher in Biochemistry I (Chem 4600/6600)

Textbook: Principles and Techniques of Practical Biochemistry, by Keith Wilson and John Walker, Cambridge University Press, ISBN 052165873 X paperback (5th Edition or newer)

Course Objective: To offer a comprehensive and integrated review of principles and modern techniques used in day-to-day biochemical research laboratories

Tentative Topics and Book Chapters (may be subject to change):

- General principles of biochemical investigations
- Molecular biology and basic techniques
- Molecular cloning and gene analysis
- Immunochemical techniques
- Centrifugation techniques
- Protein structure, purification and characterization
- Basic enzyme kinetics

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- Atomic and molecular electronic spectroscopy: X-Ray crystallography, UV-visible absorbance, fluorometry and circular dichroism spectroscopy
- Nuclear Magnetic Resonance spectroscopy
- Mass spectrometric techniques
- Electrophoretic techniques
- Chromatographic techniques
- Radioisotope techniques
- Electrochemical techniques: pH electrode, Clark oxygen electrode, biosensors

Course Requirements: Students must make any effort to attend all class sessions. Students are strongly encouraged to carefully read and study in depth the topic of the upcoming lecture on the textbook before coming to class and not to wait until the last days to study for tests.

Assignments (undergraduate students - total points 300):

- 3 assignments (100 points each, total 300 points) each with in-class and take-home parts: the take-home parts are distributed on Thursday at 10:45 AM and returned completed to the instructor on the following Tuesday by 9:30 AM: Due dates are September 16, October 7, December 2, 2014. Each 24-hour delay in turning in the take-home assignment will result in 10 points being subtracted from the grade for that assignment.

Assignments (graduate students - total points 400):

- 3 assignments (100 points each, total 300 points) each with in-class and take-home parts: the take-home parts are distributed on Thursday at 10:45 AM and returned completed to the instructor on the following Tuesday by 9:30 AM: Due dates are September 16, October 7, December 2, 2014. Each 24-hour delay in turning in the take-home assignment will result in 10 points being subtracted from the grade for that assignment.
- 1 oral presentation on a selected principle or technique of biochemistry (100 points); presentations will be held during lecture hours in November & December.
- Deadline to submit proposed lecture topic to the instructor: September 11

Projected Grading Scale: Percentiles are computed out of 300 total points available in the various assignments for undergraduate students and 400 total points available in the various assignments for graduate students; A, 90%; A-, 87%; B+, 84%; B, 80%; B-, 77%; C+, 74%; C, 70%; C-, 67%; D, 60%; F, ≤59%

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Learning Outcomes: Students will learn how biochemical investigations can be carried out and, most importantly, the tools and the basic principles underlying the diverse techniques that are routinely employed in a modern biochemistry research laboratory.

Cheating and Plagiarism: A student who cheats or plagiarizes on an assignment will receive a zero for that assignment. The Department of Chemistry follows the University Policy on Academic Honesty published in the "Faculty Affairs Handbook" and the "On Campus: The Undergraduate Co-Curricular Affairs Handbook". Any suspected offenses may be referred to the Department Chair for appropriate disciplinary action. All assignments must represent the student's individual and unaided efforts. To receive or offer information during an examination is cheating. The use of unauthorized supplementary materials during tests and to complete assignments is cheating.

Miscellaneous: October 14 is the last day to withdraw from class and receive a "W"