Kingsborough Community College
The City University of New York
Department of Biological Sciences
In Partnership with New Dorp High School
Spring 2025

BIO 6200 – BIOLOGICAL INSTRUMENTATION (2 crs. 3 hrs.)

Theory and practical operation of basic laboratory instruments and techniques, including analytical balances, pH meters, UV/VIS spectrophotometers, atomic absorption spectroscopy, chromatography, gel electrophoresis, computer-based instrumentation and other techniques.

This laboratory course presents the theory and practical operation of basic laboratory research instruments. Students design, carry out and report on research projects utilizing the following: Instruments and techniques will include the use of analytical balances, pH meters, UV/VIS spectrophotometers, atomic absorption, chromatography (paper, thin layer, column), gel electrophoresis, microscopy techniques (dissecting, compound, phase contrast, photomicroscopy, digital imaging), O2 electrode, microbial cell culture and a variety of other techniques. Laboratory quizzes, practical exams to demonstrate competency in the use of instrumentation, in class oral presentations, research proposal, and a final oral presentation will be given.

Biology 62, Biological Instrumentation, is a 2-credit, 3-hour course required of students in the Bridges to the Baccalaureate and CSTEP Programs.

Prerequisites and Corequisites: waived as per permission of the Department.

Course Objectives:
a- To introduce students to the use of basic biological research instrumentation.
b- To develop the laboratory skills and techniques required to design experimental protocols and test hypotheses utilizing basic laboratory research equipment.
c- To develop and improve scientific writing and oral communications skills based upon laboratory experiences and ability to think critically

Recommended:
Supplements and specific readings will be assigned by the instructor. Additional readings will be assigned to the students as needed.

Weekly readings from the following reading list on the use of specific instruments will be assigned. Students will design laboratory protocols utilizing appropriate equipment, and submit a laboratory report.

STUDENT OUTCOMES

Upon completion of this course, students will be able to:
1. Demonstrate the correct use of basic biological instrumentation.
2. Perform various laboratory techniques and field procedures.
3. Use the appropriate computer algorithms to identify specific protein sequences, and DNA polymorphisms.
4. Use the techniques and instrumentation demonstrated in class to carry out a faculty mentored research project.
5. Demonstrate critical thinking and the responsible/ethical use of biological instrumentation and laboratory techniques in the conduct of their research project.

Civility Statement

As an institution of higher education, Kingsborough Community College and its faculty and staff are committed to its entire student body. As such, we strive to interact with each student equitably and professionally while providing an environment of mutual respect and civility. In the event a student has an allegation charge brought against him/her that is a breach of the Henderson Rules to Maintain Public Order or the Campus Code of Conduct, an immediate investigation will commence followed by a conciliation conference to determine the appropriate outcome within a thirty day period. The Judicial Affairs process at Kingsborough Community College is critical in providing an agenda for safety, yet simultaneously offering protection of the rights of students who may have been accused of being in violation of the Henderson Rules to Maintain Public Order and/or the Campus Code of Conduct. These rights have been afforded to each Kingsborough student under the bylaws that were established in 1969.

Academic Integrity

Academic integrity means that all the work you do in this course (exams, quizzes, reports, papers, etc.) is your OWN work and no one else's. It includes not cheating on exams or quizzes in any way, as well as avoiding plagiarism in your writing. Plagiarism is using anyone else's work or ideas without proper attribution. This means that if you quote, paraphrase, or even describe in your own words, an idea that comes from someone else's writing, you MUST acknowledge that author in parentheses at the end of the sentence or sentences in which you have summarized his or her idea. Plagiarism, whether intentional or not, is taken seriously and can result in a failing grade. It is almost always very obvious if you do it, so don't risk it. If you are not sure how to reference a source, ask the instructor for help. Your instructor adheres to CUNY policy on academic integrity, which can be found in your student handbook or online at http://www.kingborough.edu/Academic_Integrity_Policy.pdf. These sources explain the policy in detail and give examples. Please be aware that academic dishonesty may result in a failing grade on the exam or in the course, as well as dismissal from the college. Additional websites that may be of use include: turnitin.com, citationmachine.com and plagiarism.org. (Polizzotto, K., personal communication, 2008).

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Equity Statement

In an ideal world, science would be objective. However, much of science is subjective and is historically built on a small subset of privileged voices. I acknowledge that much of scientific research and publications have been the work of white men. With that in mind, I have tried to select topics and activities that broaden the voice of science as well as consider and respect differences. However, although I have tried to address inequities in science, there may be both overt and covert biases in the materials you read during the course. Please contact me if you have any suggestions to improve the quality of the course materials. One of my teaching goals is to create a learning environment that supports a diversity of thoughts, perspectives, and experiences, and honors your identities (including race, gender, class, sexuality, religion, ability, etc.).

To help accomplish this:

- · I will ask you to tell me the name and/or set of pronouns you would like me to use to address you.
- · I want to be a resource for you. If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to connect with me to talk about it.

- · Like so many people, I am still in the process of learning about diverse perspectives and identities. I will make mistakes!

Kingsborough Grading Policy

Lab Assignments	30 points
Class Participation including Field Trips	30 points
Competency in the use of lab instrumentation and techniques as assessed in laboratory activities	40 points
TOTAL	**100 points**

Attendance Policy,WU and INC Grades

Attendance will be taken at the start of class. Any student not present when attendance is taken will be marked absent. If a student arrives late to class, it is the responsibility of the student to inform the instructor at the end of class that he/she came in late. At that point, the absence will be changed to late. If a student does not inform the instructor that he/she came in late, that student remains marked as absent for that class. To meet the college's attendance policy, students cannot miss more than 2 times the number of hours the class meets per week. Also, students cannot miss more than 2 labs. Over these, students will be assigned a WU grade. INC is only assigned if a student is passing the class and can pass the class if they complete the assignments that have not been submitted during the semester within the time frame established by the instructor.

Online Ethics in Research Course

All students in Bio 61 must complete an online course in "Ethics in Research". Instructions on how to access the "Ethics in Research" module online will be provided by your instructor. It is your responsibility to complete this module and print out the completion certificate. This certificate must be submitted to your instructor prior to the completion of the course. If the certificate is not submitted before the end of the semester you will receive an "INC" grade for the course and will not be permitted to conduct your summer research project.

Accessibility

Access-Ability Services (AAS) serves as a liaison and resource to the KCC community regarding disability issues, promotes equal access to all KCC programs and activities, and makes every reasonable effort to provide appropriate accommodations and assistance to students with disabilities. Please contact this office if you require such accommodations and assistance. Your instructor will be glad to make the accommodations you need, but you must have documentation from the Access-Ability office for any accommodations.

Required Materials

Note taking supplies (dedicated notebook)
Access to Google Classroom and Google Applications for making PowerPoint ,mini writing assignments etc.

Spring KBCC Required Topics Outline

*This list is meant to serve as a guideline and is subject to change based on NDHS calendar

Unit	Topic
1	**Introduction: The Nature of Science** -The Nature of Science: History and Philosophy of Scientific thought; Scientific Method. -Intro to lab safety online module. -Claim Evidence Reasoning strategy for supporting writing
2	**Microscopy** -Introduction to and use of the Compound light -Dissecting and phase contrast microscopes. -Demonstration of the Scanning Electron Microscope
3	**Introduction to Measurements** -Analytical balances, accuracy and the metric system, use of common laboratory glassware. -Solutions, serial dilutions, use of automatic pipettes -pH measurement, and buffers
	Midwinter Recess
4	**Biotechnology and Bioinformatics** Using computers to analyze genetic and protein data
5	**Field Methods in Biology**
6	**Statistical applications in Biology and Lab Safety** Using statistical software to analyze data
	Spring Recess
7	**Introduction to spectrophotometry** -Use of the UV/VIS spectrophotometer (recording) and Atomic Absorption. Use of computer for analysis and graphical presentation of data
8	**Cell Biology Techniques** -Cellular Fractionation techniques, O2 probe
9	**Electrophoresis** Protein/nucleic acid identification and characterization by electrophoresis. **DNA extraction.** Student teams offer hypotheses, and design experimental protocols to investigate selected problems
10	**PowerPoint Presentations** Presentation of research projects
Required Field Trips DNA Learning Center or Genovesi Environmental Study Center (TBD) American Museum of Natural History (Virtual Tour- TBD)	