



DEPARTMENT OF SCIENCE
COURSE INFORMATION SHEET FOR
BIO250 – BIOTECHNOLOGY

All members of the Science Department at Clinton Community College use the respective course templates as a basis for their course syllabi. Faculty may, at their discretion, change the order of the course content or add course content.

COURSE NUMBER AND TITLE: BIO250 – Biotechnology

COURSE SECTION: *TBA*

CONTACT HOURS: 5 **CREDIT HOURS:** 4

SEMESTER AND YEAR: *TBA*

INSTRUCTOR’S NAME, TELEPHONE NUMBER, EMAIL ADDRESS, OFFICE NUMBER, AND OFFICE HOURS: *TBA*

I. COURSE DESCRIPTION:

This course provides an introduction to biotechnology and its application in a variety of medical, clinical and science disciplines. Topics covered include GLP, GMP, solution chemistry, spectroscopy, chromatography, basic microbiology techniques and DNA and protein purification/separation techniques. This course emphasizes basic laboratory skills essential for beginning level employment in clinical, pharmaceutical and biotechnology laboratories. This course is well suited to students in all majors programs. There are three hours of lecture and one two-hour laboratory per week.

II. PREREQUISITE: BIO100 – Human Biology, or BIO101 – General Biology I, or CHE101 - Applied Chemistry

COREQUISITE: ENG101 – English Composition or equivalent

III. COURSE OBJECTIVES:

As the result of instructional activities, students will be able to:

1. Describe applications of biotechnology in diverse fields including environmental science, agriculture, industry, food processing, clinical medicine, forensics and plant and animal population studies.
2. Describe the correct documentation practices followed in laboratories in accordance with GLP and GMP. Read, write and follow protocols, SOPs, MSDSs batch records, training reports and regulatory submissions.
3. Demonstrate knowledge and practice of OSHA, Chemical Hygiene plans and Universal Precautions and work safely with chemicals and biological hazards.

4. Describe the process of monitoring quality in the laboratory including validation of methods such as accuracy, precision, reproducibility, linearity and range.
5. Demonstrate knowledge and use of basic math techniques including scientific notation, common logarithms, proportional relationships, frequency distributions and graphical methods.
6. Demonstrate correct sample and chemical preparation and describe the limits, variability and use of standards, calibration and traceability in measuring weight, volume, temperature and pH.
7. Describe the basic principles, instrumentation, application and methods of spectroscopy, filtration, centrifugation and bioseparation.
8. Describe the elementary principles of biotechnology including recombinant DNA technology, DNA replication, DNA sequencing, Polymerase Chain Reaction, DNA mutation and cloning.
9. Describe the specific methodologies of biotechnology in environmental toxicology and bioremediation (using microbes to clean the environment), fermentation, DNA diagnostics, genetic testing, creation of transgenic plants/animals, gene therapy, gene transfer, plant improvements and production of vaccines.
10. Discuss ethical issues in biotechnology and clinical and medical fields and debate the global impacts in various facets of society.
11. Effectively critique media presentations and reports involving biotechnology and clinical and medical chemistry.

IV. REQUIRED TEXTBOOK AND MATERIALS:

REQUIRED TEXTBOOK:

Basic Laboratory Methods for Biotechnology, Lisa Seidman and Cynthia J Moore, Prentice Hall. ISBN: 0-13-795535-9

REQUIRED MATERIALS:

1. Safety glasses are required for all on-campus sections.
2. Composition notebook is required for laboratory classes.

V. METHODS OF INSTRUCTION/COURSE ORGANIZATION: *To be determined by the respective instructor.*

VI. ATTENDANCE PROCEDURE (INCLUDING MAKEUP POLICY): *To be determined by the respective instructor.*

VII. BIBLIOGRAPHY OF READINGS (IF APPLICABLE): *To be determined by the respective instructor.*

VIII. METHODS OF EVALUATION (INCLUDING THE CALCULATION OF COURSE GRADE): *To be determined by the respective instructor. The methods of evaluation shall include tests (test types, length and weight of each), papers (weight of each), projects (weight of each), and other forms of evaluation (weight of each).*

IX. GRADING SCALE: *To be determined by the respective instructor. The grading scale shall indicate what numerical scores correspond to the following grades: A, A-, B+, B, B-, C+, C, C-, D+, D, and F.*

Please Include: If you have, or suspect you may have, any type of disability or learning problem that may require extra assistance or special accommodations, please speak to me privately after class or during my office hours as soon as possible so I can help you obtain any assistance you may need to successfully complete this course. You should also contact Laurie Bethka, Room 420M in the Academic Assistance Center, for further assistance.

X. GENERAL TOPICS OUTLINE:

1. Definition of biotechnology and its applications in medicine, food, microbial and plant genetics and forensic science.
2. Introduction to GLP, SOPs, MSDS's and FDA regulations and their applications in the workplace.
3. Solution chemistry; dilutions and concentrations, sterilization and storage of biological solutions.
4. Introduction to laboratory techniques; weights and measures, volume and temperature instrumentation and calibration.
5. Protein structure and analysis; purification and bioseparation techniques and the uses of recombinant hormones and drugs in medicine.
6. Spectroscopy, chromatography and centrifugation techniques.
7. Introduction to the chemistry and function of DNA; basic DNA and molecular biology techniques, DNA profiling and Polymerase Chain Reaction (PCR) techniques.
8. Critical analysis and interpretation of scientific data in biotechnology and clinical and medical fields.

XI. ACADEMIC INTEGRITY: Academic honesty is expected of all Clinton Community College students. It is academically dishonest, for example, to misrepresent another person's work as one's own, to take credit for someone else's work or ideas, to accept help on a test, to obtain advanced information on confidential test materials, or to intentionally harm another student's chances for academic success.

XII. COURSE CONTINUITY PLAN: In the case that the college officially closes because of an emergency which causes a short term disruption of this course, we will utilize e-mail to continue this course in the short term (1-3 weeks). All students need to utilize their campus e-mail to receive course related information.