



BROWARD COMMUNITY COLLEGE

COURSE OUTLINE

LAST REVIEW: 2010-2011
(i.e. 2003-2004)

NEXT REVIEW: 2015-2016
(i.e. 2008-2009)

STATUS: A
(A, I, D)

COURSE TITLE: Introduction to Biotechnology Laboratory

COMMON COURSE NUMBER: BSC 2421L

CREDIT HOURS: 1

CONTACT HOUR BREAKDOWN
(per 16 week term)

CLOCK HOURS:
(Voc. Course ONLY)

Lecture: **0** Lab: **48**
Clinic: Other:

PREREQUISITE(S): BSC1005, BSC1005L

COREQUISITE(S): BSC2421

PRE/COREQUISITE(S):

COURSE DESCRIPTION *(750 characters, maximum):* **This laboratory course provides hands on experience in basic and common biotechnology laboratory techniques in the areas of laboratory safety , culture techniques, laboratory skills (measurements and calculations, preparation of solutions, use of various laboratory instruments) , and microscopy. In addition, methods in DNA extraction and amplification, gene cloning, nucleic acids, and protein electrophoresis and fingerprinting will be demonstrated..**

General Education Requirements – Associate of Arts Degree (AA), meets Area(s): Area
General Education Requirements – Associate in Science Degree (AS), meets Area(s): Area
General Education Requirements – Associate in Applied Science Degree (AAS), meets Area(s): Area

UNIT TITLES

1. Laboratory safety
2. General laboratory skills
3. Culture techniques
4. Microscopy
5. Basic DNA and protein methods



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ASSESSMENT:

Please provide a brief description (250 characters maximum) that details how students will be assessed on the course outcomes.

Written tests, reports and/or use of equipment to demonstrate student competency in field.
Formulate problem, make observations, derive and test hypothesis and make conclusions.
Students use analytical reasoning skills to solve problems on written tests and/or laboratory work.
Written reports of lab experiments and/or written tests demonstrate student competency in the application of scientific knowledge.
Students use demonstrations, group discussions, written tests, laboratory reports, research projects and/or field experiences to illustrate competence in recognizing and evaluating various scientific processes.
Results from laboratory work and experiments demonstrate student awareness of science and society.



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UNITS

Unit 1 Laboratory safety

General Outcome:

- 1.0 The student shall be able to identify common lab hazards and demonstrate an understanding of safety rules, regulations, and techniques

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 1.1 Identify and apply common safety precautions in a biotechnology laboratory
- 1.2 Demonstrate proper use of laboratory safety equipment
- 1.3 Demonstrate proficiency in the proper handling and disposal of hazardous agents



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Unit 2 General laboratory skills

General Outcome:

- 2.0 The student shall learn and perform basic laboratory skills such as aseptic technique, proper measurement of reagents, and basic laboratory calculations**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 2.1 Understand and explain various sterilization methods and their applications**
- 2.2 Demonstrate proper use of an autoclave**
- 2.3 Demonstrate proper use of basic laboratory equipment including pipettors, balances and pH meters**
- 2.4 Demonstrate proficiency in preparation of various solutions**
- 2.4 Understand concepts of normality, molarity, serial dilutions, and percent solutions**
- 2.5 Understand and explain the different types of glassware and their proper use**



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Unit 3 Culture techniques

General Outcome:

- 3.0 The student shall be able to perform basic bacterial culturing techniques . The student will also demonstrate an understanding of concepts and techniques associated with cell culture**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 3.1 Perform sterile bacterial transfer methods**
- 3.2 Perform basic bacterial growth methods, including media preparation and plating techniques**
- 3.3 Perform bacterial counting and staining methods**
- 3.4 Demonstrate ability to isolate pure bacterial colonies**
- 3.5 Understand cell culture techniques including cryopreservation**
- 3.6 Perform cell passaging**
- 3.7 Maintain sterile cultures**



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Unit 4 Microscopy

General Outcome:

- 4.0 The student shall identify and understand the function of the various parts of the microscope and demonstrate an ability to perform basic microscopy. The student will also learn the various types of microscopes and their use :**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

4.1 Identify the parts of the light microscope

4.2 Operate the light microscope

4.3 Perform basic microscopy

4.4 Understand and explain fluorescence, phase contrast, and confocal microscopy



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Unit 5 Basic DNA and protein methods

General Outcome:

- 5.0 The student shall: Perform and understand basic methods of DNA and protein analysis and isolation**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 5.1 Perform DNA extractions**
- 5.2 Perform bacterial transformation with exogenous DNA**
- 5.3 Understand antibiotic selection**
- 5.4 Perform polymerase chain reaction**
- 5.5 Demonstrate competency at performing DNA electrophoresis**
- 5.6 Perform and interpret DNA fingerprinting experiments**
- 5.7 Perform and interpret polyacrylamide gel electrophoresis**
- 5.8 Conduct analysis of polyacrylamide gels with coomassie staining and destaining**