

Bates Technical College
COMPETENCY ATTAINMENT STATUS RECORD

Program Title: **BIOTECHNOLOGY LAB TECHNICIAN (March, 2002)**

STUDENT'S NAME: _____ **Date Entered Program:** _____ **Period Covered:** _____

STUDENT SIGNATURE: _____ **INSTRUCTOR SIGNATURE:** _____ **Final Report:** **yes** **no**

Student Competency Attainment/Evaluation Scale:

4: Above industry entry level requirements/standards-- Highly Competent.	2: Progressing toward entry level requirements/standards--needs additional training/ supervision.
3: Performs at industry entry level requirements/standards-- Competent.	1: Aware of entry level requirements/standards--close supervision/extensive training warranted.
0: No instruction offered and/or Not evaluated.	

Note: Students are advised to consult program's Degree Requirements document, particularly regarding Related Instruction requirements.

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BTLT 09 1 2 cr Occupational Human Relations

Apply workplace behaviors
Analyze industry occupational structure
Work in teams

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

BTLT 092 1 cr Occupational Communication Skills

Use the industry's vocabulary

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

BTLT 100 1 cr Basic Laboratory Safety

Follow safety directives
Follow lab conduct, hygiene, and safety guidelines
Safely handle and dispose of chemicals and biological materials
Identify and explain MSDS

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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BTLT 101 5 cr General Chemistry for Biotechnology

Apply knowledge of the metric system, use of significant figures and dimensional analysis
Apply knowledge of density and specific gravity
Apply knowledge of atomic structure
Perform electrophoresis exploration
Apply knowledge of chemical bonding
Apply knowledge of chemical reactions
Apply knowledge of stoichiometry, preparation of molar solutions, preparation of percent solutions & preparation of normal solutions
Apply knowledge of pH, buffers & preparation of buffer solutions

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BTLT 102 5 cr Biology of the Cell

Apply knowledge of the scientific method including hypothesis formation, experimental design and organizing & interpreting data
Use a compound light microscope and a stereomicroscope to make observations and measurements
Use the spectrophotometer
Apply knowledge of eukaryotic cell structure and function including the structure and function of cellular organelles
Apply knowledge of diffusion, osmosis, facilitated diffusion and active transport
Apply knowledge of DNA replication, transcription and translation
Extract DNA from tissue
Compare and contrast mitosis and meiosis

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

BTLT 103 1 cr Introduction to Scientific Literature

Classify scientific text as coming from a textbook, lab manual or peer-review journal
Demonstrate knowledge of the format of a typical article in a peer review journal
Report on the content peer-review journal articles
Research an assigned protocol reporting on its original appearance in a peer-review journal

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BTLT 110 2 cr Handling, Storage and Disposal of Hazardous Chemicals

Apply knowledge of chemical hazard classes
Apply knowledge of NFPA and HMIS hazard identification systems
Maintain a chemical inventory
Properly store hazardous chemicals
Apply knowledge of treatment of chemical wastes
Prepare manifest of non-treatable waste for contractor pick-up

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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

BTLT 111 5 cr Biochemistry for Biotechnology

Demonstrate knowledge of carbon chains and bonding
Identify and name alkanes, alkenes and alkynes
Distinguish between types of functional groups
Identify and name, using IUPAC nomenclature, organic molecules when given their structure and write the structure of an organic molecule when given its IUPAC name
Identify structure and function of nucleic acids, carbohydrates, protein and lipids
Conduct lab tests to differentiate between carbohydrates, lipids and proteins
Apply knowledge of oxidative phosphorylation and photosynthesis
Apply knowledge of enzymatic activity, investigating the effect of pH, temperature, substrate and enzyme concentration and inhibitors on the activity of the tyrosinase enzyme

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BTLT 112 5 cr Genetics for Biotechnology

Apply knowledge of the chromosomal theory of inheritance
Perform and evaluate test crosses that demonstrate Mendelian inheritance patterns
Apply knowledge of Chi-Square and LOD-Score analysis
Analyze human pedigrees for autosomal dominant and recessive traits and for sex-linked traits
Apply knowledge of multifactorial traits
Apply knowledge of epistasis
Determine the location of a gene on a chromosome by recombination mapping
Apply knowledge of the Polymerase Chain Reaction
Describe prokaryotic and eukaryotic gene regulation
Describe the human genome
Discuss the relationship between DNA and genetic disorders

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

BTLT 113 1 cr Current Biotechnology Presentation Topics

Participate in the program journal club

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

BTLT 120 2 cr Biohazard Abatement

Identify biohazards in the laboratory
Operate autoclave to sterilize waste, glassware and instruments
Apply knowledge of the Bloodborne Pathogen Standard
Apply knowledge of universal precautions

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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

BTLT 122 5 cr Applied Microbiology

Classify and describe microbes
Compare overall cell structure and function of prokaryotes and eukaryotes
Identify the components of media needed for growth
Compare the mechanisms used to gain energy in fermentation, aerobic respiration and anaerobic respiration
Evaluate methods used to control microorganisms
Describe the methods used to identify bacteria
Use staining and biochemical tests to identify bacterial unknowns
Perform bacterial transformations
Prepare microbiological media for bacteria and fungi including defined minimal media and media used to screen for auxotrophic mutants

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BTLT 13 2 5 cr Introduction to Molecular Techniques

Establish axenic cultures of *E. coli* and *S. cerevisiae*
Prepare culture media for *E. coli* and *S. cerevisiae*
Determine growth curves for particular strains of *E. coli* and *S. cerevisiae*
Isolate DNA from *E. coli* using a mini-prep protocol
Purify, concentrate and quantify DNA
Perform Electrophoresis exploration
Perform restriction analysis on plasmid DNA
Perform Agarose Gel Electrophoresis
Graph and interpret data

Note: This is the second page of a two-page Competency Attainment Status Record for the Biotechnology Lab Technician program. The 100-level series of courses on the first page represents competencies contained in the first year's studies of Biotechnology Lab Technician.

The following courses are a listing of the remaining Biotechnology units and competencies encountered during the student's second year, including the program's biotechnology course electives.

- | 4 | 3 | 2 | 1 | 0 | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | BTLT 200 2 cr Laboratory Mangement |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Demonstrate knowledge of inventory control |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Apply knowledge of ordering and purchasing procedures |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Maintain and calibrate micripipettors and other small laboratory equipment |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Maintain stock bacterial and fungal cultures |

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|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | BTLT 202 5 cr Advanced Molecular Techniques |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Perform large scale isolation of plasmid DNA |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Prepare and purify a biotinylated probe |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Perform Southern blot |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Isolate RNA |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Perform molecular cloning of a gene into a shuttle vector |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Perform northern blot |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Prepare competent <i>E. coli</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Perform transformation of <i>E. coli</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Perform transformation of <i>S. cerevisiae</i> |

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|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | BTLT 204 5 cr Applied Immunology |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Compare and contrast non-specific and specific defense systems |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Differentiate between humoral and cell-mediated immunity |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Describe the actions of compliment |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Compare serum proteins in terms of immunological properties |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Perform Western blotting |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Apply knowledge of immunocytochemistry techniques |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Perform ELISA techniques |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Relate a cell fusion experiment to monoclonal antibody production |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Describe autoimmune disorders and immunodeficiencies |

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| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | BTLT 210 2 cr Ethics and Science |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Discuss issues regarding bioethics and the relationship between society and biotechnology |

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|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | BTLT 220 1 cr Career Advancement Strategies |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Register with Job Service Center |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Develop career goals and an Educational Plan to meet those goals |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Use a variety of career research tools, including Internet |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Demonstrate use of job search skills/methods/tools |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Create job search documents |

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| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | BTLT 224 5 cr Tissue/Cell Culture |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Prepare cell culture media |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Culture and maintain cells |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Use hemocytometer to count cells |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Cryopreserve cells |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Operate cell culture equipment |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Perform cytotoxicity assay |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Transfect cells |

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|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | BTLT 225 5 cr Protein Purification and Analysis |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Isolate protein |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Perform protein electrophoresis |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Perform chromatography procedures |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Perform qualitative assay of protein activity in yeast colonies |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Assay protein activity in cell extracts |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Perform quantitative Lowry and Bradford protein assays |

Biotechnology Industry-Specific ELECTIVE Courses

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| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | BTLE 281 3 cr Work Based Learning Experience I |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Complete an advanced biotech project |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | BTLE 282 4 cr Work Based Learning Experience II |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Complete an advanced biotech project |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | BTLE 283 3 cr Work Based Learning Experience III |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Complete an advanced biotech project |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | BTLE 291 3 cr Independent Research Project I |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Complete an advanced biotech project |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | BTLE 292 4 cr Independent Research Project II |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Complete an advanced biotech project |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | BTLE 293 3 cr Independent Research Project III |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Complete an advanced industry research project |