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ABSTRACT

This publication contains statewide standards for the biotechnology program in Georgia. The standards are divided into 12 categories: foundations (philosophy, purpose, goals, program objectives, availability, evaluation); admissions (admission requirements, provisional admission requirements, recruitment, evaluation and planning); program structure (curriculum design, program numbering system, program consistency, exit points, credentials, course code, course consistency, course sequence, electives, course transferability); program evaluation and planning (program evaluation; program planning; enrollment, graduation, and placement levels; attrition levels; student performance); instructional program (course content; course objectives; course instruction; occupation-based instruction; evaluation of students; grading system; laboratory management; equipment, supplies, and materials; physical facility); academic skills (academic requirements); employability skills (job acquisition, job retention and advancement); staff (faculty qualifications and responsibilities); advisory committee (function, membership, meetings); special needs (commitment); equity (commitment); and health and safety (commitment). Each standard consists of these components: standard statement, explanatory comment, and evaluative criteria. (NLA)

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BIOTECHNOLOGY PROGRAM STANDARDS

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BIOTECHNOLOGY PROGRAM STANDARDS

Dr. Sheila S. Squires,
Biotechnology
Standards Development Director

University of Georgia
College of Education
Division of Adult, Business, and Vocational Education
Athens, Georgia

Dr. Richard L. Lynch, Division Chair
Ted Brown, Project Coordinator
Genet Kibreab, Publications Specialist

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The development of Biotechnology program standards is a significant step for technical education and economic development in Georgia. These standards represent a statewide commitment to provide consistent, quality technical education, to equip our graduates with the background and skills necessary to meet their individual occupational needs, and to meet the currently expanding needs of the Georgia employment market.

Many people have contributed time, effort, and expertise to the standards development project. The Georgia Board of Technical and Adult Education, the Board's Standards Committee, the standards development committee, and the project staff have worked diligently to make the establishment of these standards a reality. Robert Mabry, Doug Bolen, and Patt Stonehouse of the Georgia Department of Technical and Adult Education have provided direction for the project. Walter Sessoms, in his past role as Board's Standards Committee chairman, contributed leadership, motivation, and insight to the standards project. James Crisp, Coordinator of Educational Programs, has provided invaluable assistance in planning and monitoring the project.

These efforts have been sustained by the commitment of the Board's Standards Committee whose members each brought special concern and expertise to the standards development project. William Wiley, present committee chair, has assumed the leadership role with the energy and integrity that will assure successful progress of the standards development process.

We extend sincere thanks to each member of the Board's Standards Committee below.

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Columbus

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Columbus

Judy Hulsey
Carrollton

Costelle Walker
Atlanta

William Wiley, Chairperson
Macon

Special recognition should also be given to the standards development committee who worked to create the Biotechnology program standards. Without the cooperation of Georgia business and industry representatives who donated their time and energies to the project, these standards would not have been possible. We recognize and thank each member of the Biotechnology State Technical Committee for their invaluable contribution to the development of the program standards.

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Jack Berg
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Steven Collier
Fieldale Corporation

Nelson Cox
U.S. Department of Agriculture

Jackson Ellington
Environmental Protection Agency

Maurizio Giabbi
HazWaste Industries

Michael Hahn
University of Georgia

Eddie R. Hays
The Coca Cola Company

Jerry S. Hubbard
Georgia Institute of Technology

Jack Jones
Georgia Institute of Technology

Clyde E. Lester
Georgia Cooperative Extension Service

Mark L. Moskowitz
Universal Scientific

Daniel J. O'Neil
Georgia Tech Research Institute

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Georgia Bureau of Investigation

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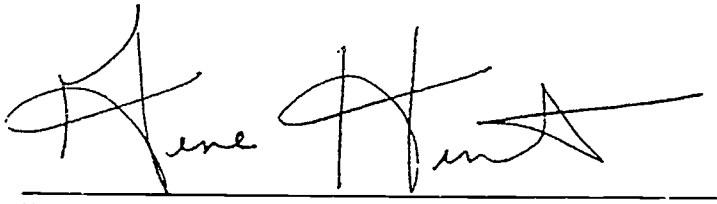
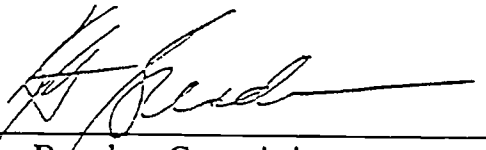


Eugene Hunt, Chairperson
Georgia Board of Technical and Adult Education



Ken Breeden, Commissioner
Georgia Department of Technical and Adult Education

BIOTECHNOLOGY PROGRAM STANDARDS

TABLE OF CONTENTS

HOW TO USE THIS MANUAL

Tab Dividers

This document is divided into sections, each section being divided from the others by means of a section-identifier tab. Each section contains standard(s) pertaining to a particular category of standards.

Table of Contents

The Table of Contents lists the tabbed categories of standards plus the title and identifier number for each standard within each tabbed section.

Numbering System

Each standard has a unique six-digit identifier number. The number is divided into three sets of two-digit couplets, each set being divided by a dash.

Example: 03-04-05...

03 indicates standard document #3 (i.e., The Electronic Engineering Standards document).

04 indicates section #4 in the document (i.e., The Program Evaluation and Planning standards section).

05 indicates standard #5 within section four (i.e., The Student Performance standard within the Program Evaluation and Planning standards section).

Finding a Standard

Standard identifier numbers appear in the upper right-hand corner of each page. To find a given standard, refer to the Table of Contents to find the identifier number of the standard of interest, select the appropriate section tab, and find the desired standard within the selected tab section.

Amendments

Registered manual holders are instructed to keep their manuals updated as amendments are disseminated.

Document Transmittal

All new or revised documents are sent to the registered holder of the manual and are recorded on a Manuals Document Transmittal Form. Transmittals are numbered consecutively, and instructions for use are printed on the form.

Amendment Record

The registered holder of the manual records the receipt of all Manual Document Transmittals on the Amendment Record. This record and instructions are found on the reverse side of the manual title page.

BIOTECHNOLOGY

FOUNDATIONS
(Philosophy)

Standard Statement

A philosophy statement is developed expressing the beliefs and values that govern the content and conduct of the Biotechnology program.

Explanatory Comment

A statewide program philosophy statement is developed and provided for the Biotechnology program. The statewide philosophy statement may be augmented at the local level so that the unique circumstances of the community may be accommodated.

The Biotechnology program philosophy statement expresses the fundamental educational and occupational principles that guide the instructional process.

Evaluative Criteria

The Biotechnology program has a clearly defined, written philosophy statement that is reviewed by the program faculty, the administration, and the program advisory committee.

Any addition to the Biotechnology program philosophy statement is developed by the program faculty, the administration, and the program advisory committee.

The philosophy of the Biotechnology program is in accordance with the philosophy of the Georgia Board of Technical and Adult Education and reflects the beliefs, values, and attitudes of the institution, the instructional field, the community, and the employment market.

The philosophy of the Biotechnology program determines the unique role of the program in meeting the technical educational needs of the students, the community, and the employment market.

The philosophy of the Biotechnology program reflects a desire to achieve educational excellence.

BIOTECHNOLOGY

The philosophy of the Biotechnology program reflects a commitment to meet the needs of business and industry.

The philosophy of the Biotechnology program includes a nondiscrimination statement pertaining to race, color, national origin, religion, sex, age, handicapping condition, academic disadvantage, and economic disadvantage.

The philosophy statement of the Biotechnology program is approved by the administration of the institution.

BIOTECHNOLOGY

PHILOSOPHY

The basic beliefs, attitudes, and concepts that are the foundation of the Biotechnology program are expressed in the following statements.

Biotechnology is a program of study which is compatible with the policies of the Georgia Board of Technical and Adult Education and encourages each Biotechnology program student to benefit and contribute as a partner in the economic development and stability of Georgia. The philosophy of the Biotechnology program is founded on the value attributed to individual students, the biotechnology profession, and technical education.

Biotechnology is a program of study which is consistent with the philosophy and purpose of the institution. The program provides academic foundations in communications, mathematics, science, and social science, as well as technical fundamentals appropriate for a two-year program at the associate degree level. Program graduates are well grounded in the underlying fundamentals of biotechnology and are well prepared for employment and subsequent upward mobility.

The biotechnology technician performs those functions which support scientists in biotechnology. Technicians may work alone, or as members of a team. Important attributes for success of program graduates are critical thinking, problem solving, and the ability to apply technology to the work requirement.

The program structure acknowledges individual differences and provides opportunities for students to seek fulfillment of their educational goals. The program does not discriminate on the basis of race, color, national origin, religion, sex, age, handicapping condition, academic disadvantage, or economic disadvantage.

To assist each student to attain his or her potential within the program, both the instructor and the student incur an obligation in the learning process. The instructor is a manager of instructional resources and organizes instruction in a manner which promotes learning. The student assumes responsibility for learning by actively participating in the learning process.

This is a dynamic field which requires extraordinary attention to current curriculum and up-to-date instructional equipment. The program promotes the concept of change as the technology evolves. The need for nurturing the spirit of involvement and lifelong learning is paramount in the biotechnology profession.

BIOTECHNOLOGY

FOUNDATIONS
(Purpose)

Standard Statement

A purpose statement delineating the instructional services which the Biotechnology program provides is developed and implemented.

Explanatory Comment

A statewide purpose statement is developed and provided for the Biotechnology program. The statewide purpose statement may be augmented at the local level so that the unique circumstances of the community may be accommodated.

A major purpose of the Biotechnology program is to meet community and employment market needs for education in biotechnology.

Evaluative Criteria

The Biotechnology program has a clearly defined, written purpose statement that is reviewed by the program faculty, the administration, and the program advisory committee.

Any addition to the Biotechnology program purpose statement is developed by the program faculty, the administration, and the program advisory committee.

The purpose of the Biotechnology program is in accordance with the purpose of the Georgia Board of Technical and Adult Education and the institution.

The purpose of the Biotechnology program reflects the values and beliefs expressed in the program philosophy.

The purpose of the Biotechnology program includes a nondiscrimination statement pertaining to race, color, national origin, religion, sex, age, handicapping condition, academic disadvantage, and economic disadvantage.

The purpose statement of the Biotechnology program is approved by the administration of the institution.

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PURPOSE

The purpose of the Biotechnology program is to provide educational opportunities to individuals that will enable them to obtain the knowledge, skills, and attitudes necessary to succeed in the field of biotechnology.

The Biotechnology program provides educational opportunities regardless of race, color, national origin, religion, sex, age, handicapping condition, academic disadvantage, or economic disadvantage.

The Biotechnology program is intended to produce associate degree graduates who are prepared for employment in varied positions in the field of biotechnology.

Program graduates are to achieve college-level competency in the general areas of composition, technical writing, algebra, biology, chemistry, and behavioral science. Graduates are to be competent to perform basic technical functions in organic chemistry, microbiology, biochemistry, bioseparations, biotechnology, qualitative and quantitative analysis, and instrumental analysis.

BIOTECHNOLOGY

FOUNDATIONS
(Goals)

Standard Statement

A program goals statement focuses the efforts of the Biotechnology program.

Explanatory Comment

A statewide goals statement is developed and provided for the Biotechnology program. The statewide program goals statement may be augmented at the local level so that the unique circumstances of the community may be accommodated.

Goals are broad statements of intent that delineate the achievements the Biotechnology program seeks to attain. Goals are stated in non-quantifiable terms.

Evaluative Criteria

The Biotechnology program has a clearly defined, written goals statement that is reviewed by the program faculty, the administration, and the program advisory committee.

Any addition to the Biotechnology program goals statement is developed by the program faculty, the administration, and the program advisory committee.

The goals of the Biotechnology program are in accordance with the philosophy and purpose of the program.

The goals of the Biotechnology program reflect a desire to provide exemplary technical education.

The goals of the Biotechnology program are the basis for the development of program objectives.

The goals of the Biotechnology program include a nondiscrimination statement pertaining to race, color, national origin, religion, sex, age, handicapping condition, academic disadvantage, and economic disadvantage.

The goals statement of the Biotechnology program is approved by the administration of the institution.

BIOTECHNOLOGY

GOALS
(Process)

The goals of the Biotechnology program are to:

1. Provide education which acknowledges individual differences and respects the right of individuals to seek fulfillment of educational needs.

2. Provide an environment which encourages the individual to benefit and contribute as a partner in the economic progress, development, and stability of Georgia.

3. Provide education which develops the potential of each student to become a productive, responsible, and upwardly mobile member of society.

4. Provide quality biotechnology education in an atmosphere that fosters interest in and enthusiasm for learning.

5. Prepare graduates to function as accountable and responsible members within their field of endeavor.

6. Prepare graduates to function as safe and competent practitioners in the biotechnology field.

7. Prepare program graduates with the highest level of competence possible given the constraints of the interests and ability levels of the individual.

8. Provide educational and related services without regard to race, color, national origin, religion, sex, age, handicapping condition, academic disadvantage, or economic disadvantage.

9. Foster employer participation, understanding, and confidence in the instructional process and the competence of Biotechnology program graduates.

BIOTECHNOLOGY

FOUNDATIONS
(Program Objectives)

Standard Statement

An objectives statement based on established program goals is developed for the Biotechnology program.

Explanatory Comment

A statewide objectives statement is developed and provided for the Biotechnology program. The statewide program objectives statement may be augmented at the local level so that the unique circumstances of the community may be accommodated.

Program objectives are desired program outcomes stated in measurable, temporal, and operational terms.

Evaluative Criteria

The Biotechnology program has a clearly defined, written objectives statement that is reviewed by the program faculty, the administration, and the program advisory committee.

Any addition to the Biotechnology program objectives statement is developed by the program faculty, administration, and the program advisory committee.

The objectives of the Biotechnology program stress learning outcomes, efficiency, enrollment, public relations, and other outcomes that impact on program quality.

A major objective of the Biotechnology program is student achievement of identified exit point competencies.

The objectives of the Biotechnology program include a nondiscrimination statement pertaining to race, color, national origin, religion, sex, age, handicapping condition, academic disadvantage, and economic disadvantage.

The objectives statement of the Biotechnology program is approved by the administration of the institution.

BIOTECHNOLOGY

OBJECTIVES
(Process)

The objectives of the Biotechnology program are to:

1. Provide current curriculum, instructional materials, and equipment (in accordance with available funding) which teach knowledge, skills, and attitudes appropriate to industry needs.

2. Provide educational facilities which foster learning and provide safe, healthy environments available and accessible to all students who can benefit from the program.

3. Provide collegiate-level academic instruction which supports effective learning within the program and which enhances professional performance on the job.

4. Provide employability skills which foster work attitudes and work habits that will enable graduates of the program to perform as competent and responsible employees.

5. Nurture the desire for learning so that graduates will pursue their own continuing education as a lifelong endeavor.

6. Provide an educational atmosphere which promotes a positive self-image and a sense of personal well-being.

7. Provide education that fosters development of good safety habits.

8. Provide admission, educational, and placement services without regard to race, color, national origin, religion, sex, age, handicapping condition, academic disadvantage, or economic disadvantage.

9. Provide information to the public regarding the program that will facilitate recruitment and enrollment of students.

10. Promote good public relations via contacts and regular communications with business, industry, and the public sector.

11. Promote faculty and student rapport and communications to enhance student success in the program.

Standard Number:
75-01-05

BIOTECHNOLOGY

FOUNDATIONS
(Availability)

Standard Statement

Written philosophy, purpose, goals, and objectives statements for the Biotechnology program are made available to the staff of the institution and the general public.

Explanatory Comment

Published Biotechnology program philosophy and purpose statements are important recruitment tools that help students to select programs that meet their needs.

Evaluative Criteria

The philosophy and purpose statements of the Biotechnology program are published and made available to the staff of the institution and the general public.

Written goals and objectives are available for the Biotechnology program.

Biotechnology program philosophy, purpose, goals, and objectives statements are used by student development services personnel to aid in recruiting and placing students.

BIOTECHNOLOGY

FOUNDATIONS
(Evaluation)

Standard Statement

The philosophy, purpose, goals, and objectives of the Biotechnology program are evaluated.

Explanatory Comment

The evaluation of the Biotechnology program philosophy, purpose, goals, and objectives assists the program in meeting student, community, and employment market needs.

Evaluative Criteria

Formal evaluation of the philosophy, purpose, goals, and objectives of the Biotechnology program is performed annually and documents input from the program faculty, the administration, and the program advisory committee.

Evaluation of the philosophy, purpose, goals, and objectives of the Biotechnology program is conducted to assure congruence with changing community and employment market needs and Georgia Board of Technical and Adult Education philosophy and purpose statements.

Evaluation of the philosophy, purpose, goals, and objectives of the Biotechnology program assesses congruence with the requirements of the designated accrediting agency(ies).

Evaluation processes are designed to consider state evaluation processes and requirements and to verify that the philosophy, purpose, goals, and objectives of the Biotechnology program are being fulfilled.

Evaluation of the philosophy, purpose, goals, and objectives of the Biotechnology program results in revision, as needed.

BIOTECHNOLOGY

ADMISSIONS
(Admission Requirements)

Standard Statement

Statewide admission requirements are implemented for the Biotechnology program.

Explanatory Comment

Admission refers to regular admission into a degree granting program.

Statewide program admission requirements consider state and national occupational licensing and certifying requirements, where applicable.

The institution develops and implements clearly stated degree program admissions policies and procedures.

Evaluative Criteria

The requirements for admission to the Biotechnology program are:
a) attainment of 16 or more years of age;
b) documentation of high school graduation or satisfaction of High School Equivalency Certificate requirements;
c) achievement of minimum regular admission scores on tests of reading, language, and math as specified in GDTAE document *Minimum Program Entrance Scores*; and
d) completion of application and related procedures.

Admission of transfer students to the Biotechnology program is contingent upon their meeting the following requirements:
a) regular admission and good standing at a regionally accredited diploma or degree granting institution; and
b) proper completion of application and related procedures.

BIOTECHNOLOGY

ADMISSIONS
(Provisional Admission Requirements)

Standard Statement

Statewide provisional admission requirements are implemented for the Biotechnology program.

Explanatory Comment

Provisional admission is granted to qualified students who do not meet the regular admission requirements of the program.

Provisionally admitted students are allowed to take developmental studies courses and/or pre-tech courses and certain occupational courses as designated in the course sequence standard.

The institution develops and implements clearly stated policies and procedures for entry into degree programs on a provisional basis.

Evaluative Criteria

Provisional admission to the Biotechnology program is afforded those students who do not meet program admission requirements but who meet provisional admission requirements.

The requirements for provisional admission to the Biotechnology program are:

a) attainment of 16 or more years of age;
b) documentation of high school graduation or satisfaction of High School Equivalency Certificate requirements;
c) achievement of minimum provisional admission scores on tests of reading, language, and math as specified in GDTAE document *Minimum Program Entrance Scores*; or recommendation by program faculty and designated admissions personnel on the basis of interview and assessment of student potential; and
c) completion of application and related procedures.

All Biotechnology program students initially admitted on a provisional basis meet regular admission requirements prior to graduation.

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Provisionally admitted students whose math and/or verbal achievement levels do not meet regular program admission requirements are required to enroll in developmental studies courses approved by the Georgia Board of Technical and Adult Education.

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ADMISSIONS
(Recruitment)

Standard Statement

The Biotechnology program recruitment materials and practices are in the best interests of the students, institution, community, and employment market.

Explanatory Comment

The recruitment effort makes potential students aware of the services provided by the Biotechnology program and the institution.

The recruitment effort seeks to serve the economic development of the community by affording opportunities to prospective students.

The institution develops and implements a systematic, overall recruitment effort designed to assist students in meeting their occupational needs.

Evaluative Criteria

The recruitment effort assists in maintaining and/or increasing the Biotechnology program and institution enrollments.

The recruitment effort of the Biotechnology program includes participation in or assistance with:

a) development and dissemination of informational materials;
b) recruitment activities with other programs within the institution;
c) communication with potential students through contact with employers, secondary schools, organizations, the program advisory committee, and others;
d) promotion of Biotechnology program awareness among individuals and groups; and
e) consideration of the industrial and business needs of the community and employment market.

All recruitment materials and practices are ethical, equitable, and accurate in the depiction of the institution, the Biotechnology program, and the potential benefits of program completion.

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A written description of the admission requirements and procedures, tuition fees, and other costs of the Biotechnology program is made available to potential students.

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ADMISSIONS
(Evaluation and Planning)

Standard Statement

An evaluation of the admission requirements of the Biotechnology program is conducted.

Explanatory Comment

The admission requirements of the Biotechnology program are compatible with the admissions policies and procedures of the institution.

Evaluative Criteria

Biotechnology program admission requirements are evaluated annually to assure compliance with Georgia Board of Technical and Adult Education policies and standards and designated accrediting agency requirements.

The administration, with input from the program faculty and advisory committee, conducts an annual evaluation of Biotechnology program admission requirements to assess their adequacy in meeting the needs of the students, community, and employment market.

The evaluation results are used to modify the admissions procedures of the institution and to suggest Biotechnology program admission changes to the Georgia Board of Technical and Adult Education, as needed.

BIOTECHNOLOGY

PROGRAM STRUCTURE
(Curriculum Design)

Standard Statement

The curriculum of the Biotechnology program includes four categories of instruction: general core courses, fundamental technical courses, specific technical courses, and elective courses.

Explanatory Comment

General core courses and fundamental technical courses provide the academic and technical background that supports the specific technical and elective courses.

Evaluative Criteria

The Biotechnology program requires student completion of general core courses such as math, language skills, and other courses required by the Georgia Board of Technical and Adult Education.

The Biotechnology program requires student completion of fundamental technical courses in introductory concepts, principles, and technologies that provide the foundations for the given occupation and related fields.

The Biotechnology program requires student completion of specific technical courses that build on the foundations provided in the fundamental technical courses.

Biotechnology program students are offered the opportunity to take state-approved elective courses in order to develop their individual interests.

BIOTECHNOLOGY

PROGRAM STRUCTURE
(Program Numbering System)

Standard Statement

A Classification of Instructional Programs (CIP) code is applied to the Biotechnology program.

Explanatory Comment

Assignment of a statewide CIP code to every diploma/degree program is the basis for consistent program identification.

Evaluative Criteria

The Biotechnology program is assigned a (PGM) CIP code of (PGM) 41.0101 and is consistent with all other programs throughout the state which have the same (PGM) CIP code.

BIOTECHNOLOGY

PROGRAM STRUCTURE
(Program Consistency)

Standard Statement

The Biotechnology program utilizes essential course components consistent with statewide program requirements.

Explanatory Comment

Programs assigned an identical (PGM) CIP code are consistent statewide.

Evaluative Criteria

The Biotechnology program is assigned a (PGM) CIP code of (PGM) 41.0101 and utilizes essential components designated for that program number statewide. Program components include, but are not limited to:

a) Program Title

Biotechnology, associate degree

b) Program Description

The Biotechnology program is a planned sequence of carefully developed college-level courses designed to prepare students to work as technicians in one of the various specialties in the field. Graduates will receive a Biotechnology associate degree. The program of study emphasizes the application of science and technology combined to prepare graduates to support scientists in various fields of biotechnology.

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c) Essential Courses			Credits
1) Essential General Core Courses			30
Area I			
ENG	191	Composition and Rhetoric I	5
Area II			
PSY	191	Introductory Psychology	5
Area III			
BIO	191	Biology I	5
CHM	191	Chemistry I	5
CHM	192	Chemistry II	5
MAT	191	College Algebra	5
2) Essential Fundamental Technical Courses			23
SCT	104	Microbiology I	6
SCT	105	Microbiology II	6
SCT	106	Organic Chemistry I	5
SCT	107	Organic Chemistry II	6
3) Essential Specific Technical Courses			45
BIT	201	Biochemistry	5
BIT	202	Bioseparations	6
BIT	203	Biotechnology I	8
BIT	204	Biotechnology II	6
RLT	206	Qualitative and Quantitative Analysis	5
RLT	209	Instrumental Analysis I	8
XXX	xxx	Electives	7
4) Essential Electives			10

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d) Program Final Exit Point

Biotechnology technician

e) Credits Required for Graduation

108 minimum quarter hour credits required for graduation

BIOTECHNOLOGY

PROGRAM STRUCTURE
(Exit Points)

Standard Statement

The Biotechnology program faculty documents student attainment of identified exit points.

Explanatory Comment

Exit points are the points within the program at which technical competencies are achieved to qualify students for an entry level position in their field.

Evaluative Criteria

The faculty of the Biotechnology program monitors, evaluates, and records student progress towards achieving exit point competency levels.

The final Biotechnology program exit point, documented by an associate degree, is that of biotechnology technician.

The institution documents completion of exit points with a transcript.

Graduation from the Biotechnology program is dependent upon meeting the requirements of the Georgia Board of Technical and Adult Education.

BIOTECHNOLOGY

PROGRAM STRUCTURE
(Credentials)

Standard Statement

The achievement of Biotechnology program graduates and leavers is documented by the institution.

Explanatory Comment

A program graduate is a student who successfully fulfills all program requirements. A program leaver is a student who exits from the program prior to completion of all program requirements.

Course description documents are based on the course title, the essential course description, the essential competency areas taught, and the number of credits awarded as detailed in the program-specific standards and the listing of state-approved electives.

Evaluative Criteria

The institution grants Biotechnology program graduates an associate degree certifying satisfaction of program requirements.

Upon request, each Biotechnology program graduate is provided a transcript and course description document detailing courses taken, grades, credits earned, and credential awarded.

Upon request, each Biotechnology program leaver who has completed one or more courses is provided a transcript and course description document detailing courses taken, grades, and credits earned.

Upon request, each Biotechnology program leaver who has not completed an entire course is provided a transcript and course description document detailing the course entered and withdrawal.

BIOTECHNOLOGY

PROGRAM STRUCTURE
(Course Code)

Standard Statement

A statewide course identification code is applied to each Biotechnology course.

Explanatory Comment

An alphanumeric identification code is assigned to each course.

All Georgia Board of Technical and Adult Education approved courses are included in the course identification coding system.

Evaluative Criteria

Each Biotechnology course is assigned an alphanumeric descriptor that serves as the statewide course identification code.

The following list contains the Georgia Board of Technical and Adult Education designated course titles and course identification codes of the Biotechnology program.

BIO	191	Biology I
BIT	201	Biochemistry
BIT	202	Bioseparations
BIT	203	Biotechnology I
BIT	204	Biotechnology II
CHM	191	Chemistry I
CHM	192	Chemistry II
ENG	191	Composition and Rhetoric I
MAT	191	College Algebra
PSY	191	Introductory Psychology
RLT	206	Qualitative and Quantitative Analysis
RLT	209	Instrumental Analysis I
SCT	104	Microbiology I
SCT	105	Microbiology II
SCT	106	Organic Chemistry I
SCT	107	Organic Chemistry II

BIOTECHNOLOGY

PROGRAM STRUCTURE
(Course Consistency)

Standard Statement

Courses assigned a given course identification code are consistent.

Explanatory Comment

Courses assigned the same course identification code are consistent throughout the state.

One quarter equals a minimum of 50 instructional days. One contact hour equals a minimum of 50 minutes of instruction.

One (1) quarter hour credit is defined as follows:

a) class - One contact hour of class per week for the duration of a quarter equals one quarter hour credit; class is defined as instruction which emphasizes group or individualized classroom learning.

b) demonstration laboratory (D.Lab) - Two contact hours of demonstration laboratory per week for the duration of a quarter equals one quarter hour credit; demonstration laboratory is defined as instruction which emphasizes teacher assisted learning activities.

c) practical performance laboratory (P.Lab) - Three contact hours of practical performance laboratory per week for the duration of a quarter equals one quarter hour credit; practical performance laboratory is defined as instruction which emphasizes structured activities requiring the application and practice of occupational competencies.

d) occupation-based instruction (O.B.I.) - Three contact hours of occupation-based instruction per week for the duration of a quarter equals one quarter hour credit; occupation-based instruction is defined as instruction which emphasizes supervised work-experience activities requiring the application of occupational competencies.

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Evaluative Criteria

Each course assigned a given course identification code utilizes certain components identical to those designated for that course identification code statewide.

Components designated for each course identification code include:
a) course title;
b) essential course description;
c) essential competency areas taught; and
d) number of quarter hour credits awarded for course completion.

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Courses in the Biotechnology program include:

BIO 191 - BIOLOGY I

Provides an introduction to basic biological concepts. Topics include: classification of plants and animals, cell theory, cell structure, plant and animal tissues and organs, nutritional requirements of plants and animals, energy metabolism, and use of basic biology laboratory techniques and equipment.

Competency Areas

- Classification of Plants and Animals
- Cell Theory
- Cell Structure
- Plant and Animal Tissues and Organs
- Nutritional Requirements of Plants and Animals
- Energy Metabolism
- Use of Basic Biology Laboratory Techniques and Equipment

Hours

Class/Week - 4
P.Lab/Week - 3
Credit - 5

Prerequisite: Program admission

BIOTECHNOLOGY

BIT 201 - BIOCHEMISTRY

This course presents an overview of the chemistry of living systems. Included is a study of biological molecules, metabolism, and molecular genetics. Topics include: carbohydrates and lipids, amino acids and proteins, the biochemical organization of the cell, biochemical energetics, enzyme and enzyme kinetics, carbohydrate metabolism, lipid metabolism, the tricarboxylic acid cycle, electron transport and oxidative phosphorylation, photosynthesis, and biosynthesis of nucleic acids and proteins.

Competency Areas

- Carbohydrates and Lipids
- Amino Acids and Proteins
- The Biochemical Organization of the Cell
- Biochemical Energetics
- Enzyme and Enzyme Kinetics
- Carbohydrate Metabolism
- Lipid Metabolism
- The Tricarboxylic Acid Cycle
- Electron Transport and Oxidative Phosphorylation
- Photosynthesis
- Biosynthesis of Nucleic Acids and Proteins

Hours

Class/Week - 5
Lab/Week - 0
Credit - 5

Prerequisite: SCT 107

BIOTECHNOLOGY

BIT 202 - BIOSEPARATIONS

This course develops expertise in the isolation and purification of biologically important molecules. Topics include: buffer preparation, protein isolation and purification, gel permeation chromatography, ion exchange chromatography, isolation of DNA, gel electrophoresis, scintillation counting, enzyme assays, and radiation safety.

Competency Areas

- Buffer Preparation
- Protein Isolation and Purification
- Gel Permeation Chromatography
- Ion Exchange Chromatography
- Isolation of DNA
- Gel Electrophoresis
- Scintillation Counting
- Enzyme Assays
- Radiation Safety

Hours

Class/Week - 3
P.Lab/Week - 9
Credit - 6

Prerequisites: BIT 201, RLT 209

BIOTECHNOLOGY

BIT 203 - BIOTECHNOLOGY I

Explores basic procedures used in biotechnology. Emphasis will be placed on manipulation of genetic constituents to produce medically and industrially important metabolites, utilization of microorganisms in industrial processes, and cloning of plants. Topics include: isolation and characterization of DNA; principles of genetic engineering; plant tissue culture; vitamin, amino acid, ethanol, and organic acid production; microbial fermentation technology; and food fermentation.

Competency Areas	Hours
- Isolation and Characterization of DNA - Principles of Genetic Engineering - Plant Tissue Culture - Vitamin, Amino Acid, Ethanol, and Organic Acid Production - Microbial Fermentation Technology - Food Fermentation	Class/Week - 5 P.Lab/Week - 9 Credit - 8

Prerequisites: SCT 105, SCT 107

BIOTECHNOLOGY

BIT 204 - BIOTECHNOLOGY II

Explores how to utilize organisms isolated and characterized in the basic biotechnology course to produce various pharmaceuticals (antibiotics and vitamins), organic acids, amino acids, enzymes, single-cell proteins, and synthetic fuels. Topics include: biological production, purification, and analysis of antibiotics, vitamins, organic acids, enzymes, and synthetic fuels.

Competency Areas	Hours
- Biological Production, Purification, and Analysis of Antibiotics, Vitamins, Organic Acids, Enzymes, and Synthetic Fuels	Class/Week - 3 P.Lab/Week - 9 Credit - 6

Prerequisite: BIT 203

CHM 191 - CHEMISTRY I

Provides an introduction to basic chemical principles and concepts which explain the behavior of matter. Topics include: measurement, atomic structure, chemical bonding, physical states of matter, nomenclature, and stoichiometry.

Competency Areas	Hours
- Measurement - Atomic Structure - Chemical Bonding - Physical States of Matter - Nomenclature - Stoichiometry	Class/Week - 4 P.Lab/Week - 3 Credit - 5

Prerequisite: Program admission level math achievement

BIOTECHNOLOGY

CHM 192 - CHEMISTRY II

Continues the exploration of basic chemical principles and concepts. Topics include: equilibrium theory, solution chemistry, acid-base theory, and nuclear chemistry.

Competency Areas	Hours
- Equilibrium Theory	Class/Week - 4
- Solution Chemistry	P.Lab/Week - 3
- Acid-Base Theory	Credit - 5
- Nuclear Chemistry	

Prerequisite: CHM 191

ENG 191 - COMPOSITION AND RHETORIC I

Emphasizes the analysis of literature and articles about issues in the humanities and in society. Students practice various modes of writing, ranging from description to exposition to argumentation and persuasion. The course includes a review of standard grammatical and stylistic usage in proofreading and editing. An introduction to library resources lays the foundation for research. Topics include: modes of writing, revision, and research.

Competency Areas	Hours
- Modes of Writing	Class/Week - 5
- Revision	Lab/Week - 0
- Research	Credit - 5

Prerequisite: Program admission level language competency or ENG 098

BIOTECHNOLOGY

MAT 191 - COLLEGE ALGEBRA

Emphasizes techniques of problem solving using algebraic concepts. Topics include: algebraic concepts and operations, linear and quadratic equations and functions, simultaneous equations, inequalities, exponents and powers, graphing techniques, and analytic geometry.

Competency Areas

- Algebraic Concepts and Operations
- Linear and Quadratic Equations and Functions
- Simultaneous Equations
- Inequalities
- Exponents and Powers
- Graphing Techniques
- Analytic Geometry

Hours

Class/Week - 5
Lab/Week - 0
Credit - 5

Prerequisite: Program admission level math achievement

PSY 191 - INTRODUCTORY PSYCHOLOGY

Emphasizes the basics of psychology. Topics include: science of psychology; social environments; life stages; physiology and behavior; personality; emotions and motives; conflicts, stress, anxiety, and abnormal behavior; and perception, learning, and intelligence.

Competency Areas

- Science of Psychology
- Social Environments
- Life Stages
- Physiology and Behavior
- Personality
- Emotions and Motives
- Conflicts, Stress, Anxiety, and Abnormal Behavior
- Perception, Learning, and Intelligence

Hours

Class/Week - 5
Lab/Week - 0
Credit - 5

Prerequisite: Program admission

BIOTECHNOLOGY

RLT 206 - QUALITATIVE AND QUANTITATIVE ANALYSIS

Develops skill in traditional wet chemical analysis and quantitative laboratory measurements and stoichiometry. Qualitative analysis emphasizes solution preparation and chemical techniques. Quantitative analysis emphasizes instrumental studies involving spectrophotometric analysis and atomic absorption spectroscopy. Topics include: pH and pOH, chemical equilibria, ionization constants and solubility products, identification of cations, spectrophotometry, and concentration determinations.

Competency Areas

- pH and pOH
- Chemical Equilibria
- Ionization Constants and Solubility Products
- Identification of Cations
- Spectrophotometry
- Concentration Determinations

Hours

Class/Week - 3
P.Lab/Week - 6
Credit - 5

Prerequisite: CHM 192

BIOTECHNOLOGY

RLT 209 - INSTRUMENTAL ANALYSIS I

Develops expertise in the use of common laboratory instruments. Instrumental methods will be used in the isolation and purification of natural products. Topics include: gas chromatography, integrators/computer work station use, liquid chromatography, ultraviolet/visible spectrophotometry, infrared spectrophotometry, gel electrophoresis, sample preparation, use of radioisotopes, mass spectrometry, nuclear magnetic resonance, and radiation safety.

Competency Areas

- Gas Chromatography
- Integrators/Computer Work Station Use
- Liquid Chromatography
- Ultraviolet/Visible Spectrophotometry
- Infrared Spectrophotometry
- Gel Electrophoresis
- Sample Preparation
- Use of Radioisotopes
- Mass Spectrometry
- Nuclear Magnetic Resonance
- Radiation Safety

Hours

Class/Week - 5
P.Lab/Week - 9
Credit - 8

Prerequisite: RLT 206

BIOTECHNOLOGY

SCT 104 - MICROBIOLOGY I

Provides a foundation in the basic principles and laboratory techniques of microbiology. Emphasis is placed on the characteristics of different microorganisms and on safe laboratory procedures including the use and care of the compound light microscope, methods of media preparation, staining, and bacterial growth and enumeration. Topics include: the scope and history of microbiology; characterization, classification, and identification of microorganisms; morphology and fine structure of bacteria; gram negative and gram positive bacteria; reproduction and growth of bacteria; bacterial enzymes and metabolism in diagnostic tests; use of compound light microscopes; media preparation; isolation, characterization, and cultivation techniques; anaerobic microorganism cultivation; and laboratory safety.

Competency Areas	Hours
- Scope and History of Microbiology - Characterization, Classification, and Identification of Microorganisms - Morphology and Fine Structure of Bacteria - Gram Negative and Gram Positive Bacteria - Reproduction and Growth of Bacteria - Bacterial Enzymes and Metabolism in Diagnostic Tests - Use of Compound Light Microscopes - Media Preparation - Isolation, Characterization, and Cultivation Techniques - Anaerobic Microorganism Cultivation - Laboratory Safety	Class/Week - 4 P.Lab/Week - 8 Credit - 6

Prerequisite: CHM 191
Prerequisite/Corequisite: SCT 106

BIOTECHNOLOGY

SCT 105 - MICROBIOLOGY II

Continues the study of basic microbiology and introduces the application of techniques concerned with physiology, growth, nutrition, and genetics of microorganism species. Topics include: antibiotics and chemotherapeutic agents; microbial interrelationships; epidemiology of infectious diseases; pathogenic bacteria; the nitrogen, carbon, and sulfur cycles; bacterial content in water; bacteria significant in medicine; and physical and chemical control of microorganisms.

Competency Areas	Hours
- Antibiotics and Chemotherapeutic Agents	Class/Week - 4
- Microbial Interrelationships	P.Lab/Week - 8
- Epidemiology of Infectious Diseases	Credit - 6
- Pathogenic Bacteria	
- Nitrogen, Carbon, and Sulfur Cycles	
- Bacterial Content in Water	
- Bacteria Significant in Medicine	
- Physical and Chemical Control of Microorganisms	

Prerequisite: SCT 104

BIOTECHNOLOGY

SCT 106 - ORGANIC CHEMISTRY I

Introduces organic chemistry and the role of hydrocarbons and their products. Topics include: functional groups and structural formulas of organic compounds, IUPAC nomenclature, common nomenclature, properties of organic compounds, nomenclature of functional groups, safety procedures for organic laboratories, separation and purification of organic compounds, structural formulas of functional groups, and hazardous waste disposal. Laboratory experiences stress techniques of preparation, isolation, and purification of organic compounds.

Competency Areas	Hours
- Functional Groups and Structural Formulas of Organic Compounds - IUPAC Nomenclature - Common Nomenclature - Properties of Organic Compounds - Nomenclature of Functional Groups - Safety Procedures for Organic Laboratories - Separation and Purification of Organic Compounds - Structural Formulas of Functional Groups - Hazardous Waste Disposal	Class/Week - 4 P.Lab/Week - 3 Credit - 5

Prerequisite: CHM 191

BIOTECHNOLOGY

SCT 107 - ORGANIC CHEMISTRY II

Continues the study of organic chemistry with emphasis on reactions of functional groups. Laboratories will provide in-depth experiences in synthesis, isolation, and purification techniques for organic compounds. Topics include: diagnostic testing of functional groups, products of functional group reactions, synthesis and purification of functional groups, stereochemistry, chromatography and spectroscopy, organic reactions, and organic synthesis.

Competency Areas	Hours
- Diagnostic Testing of Functional Groups	Class/Week - 4
- Products of Functional Group Reactions	P.Lab/Week - 6
- Synthesis and Purification of Functional Groups	Credit - 6
- Stereochemistry	
- Chromatography and Spectroscopy	
- Organic Reactions	
- Organic Synthesis	

Prerequisite: SCT 106

BIOTECHNOLOGY

PROGRAM STRUCTURE
(Course Sequence)

Standard Statement

The Biotechnology program requires students to progress through the four instructional course categories in a developmentally valid sequence.

Explanatory Comment

The four instructional course categories are: general core courses, fundamental technical courses, specific technical courses, and elective courses.

A developmentally valid instructional sequence is one in which the student acquires prerequisite knowledge and skills before progressing to more advanced studies.

Evaluative Criteria

The Biotechnology program requires students to complete prerequisite courses prior to enrolling in subsequent courses.

Provisions are made for Biotechnology program students to exempt courses in which they are competent.

The Biotechnology program complies with the required provisional admission, program admission, and/or program admission level competency prerequisites in the following list.

The Biotechnology program reflects the suggested course prerequisites and/or corequisites in the following list.

(In the list below prerequisites are indicated by [P],
and prerequisites/corequisites are indicated by [P/C].)

Courses			Sequence
BIO	191	Biology I	[P] Program admission
BIT	201	Biochemistry	[P] SCT 107
BIT	202	Bioseparations	[P] BIT 201, RLT 209

BIOTECHNOLOGY

BIT	203	Biotechnology I	[P] SCT 105, SCT 107
BIT	204	Biotechnology II	[P] BIT 203
CHM	191	Chemistry I	[P] Program admission level math achievement
CHM	192	Chemistry II	[P] CHM 191
ENG	191	Composition and Rhetoric I	[P] Program admission level language competency or ENG 098
MAT	191	College Algebra	[P] Program admission level math achievement
PSY	191	Introductory Psychology	[P] Program admission
RLT	206	Qualitative and Quantitative Analysis	[P] CHM 192
RLT	209	Instrumental Analysis I	[P] RLT 206
SCT	104	Microbiology I	[P] CHM 191 [P/C] SCT 106
SCT	105	Microbiology II	[P] SCT 104
SCT	106	Organic Chemistry I	[P] CHM 191
SCT	107	Organic Chemistry II	[P] SCT 106

BIOTECHNOLOGY

PROGRAM STRUCTURE
(Electives)

Standard Statement

Electives are made available for the Biotechnology program.

Explanatory Comment

Biotechnology program students are provided opportunities to enroll in state-approved elective courses. Elective courses utilize the following components: course title, essential course description, essential competency areas, and number of credits awarded for course completion.

Required courses for a degree program are available to other degree programs as elective courses.

Evaluative Criteria

Electives are established utilizing the following process:

a) The administration of the institution, the program faculty, and the program advisory committee cooperate in establishing and utilizing a system to recommend needed and feasible elective courses;
b) The administration of the institution, the program faculty, and the program advisory committee communicate with the statewide program technical committee and appropriate staff of the Georgia Department of Technical and Adult Education concerning the proposed elective(s);
c) The administration of the institution, the program faculty, and the program advisory committee consider revisions and prepare a final elective course proposal;
d) The administration of the institution presents the elective course proposal to the appropriate staff of the Georgia Department of Technical and Adult Education;
e) The staff of the Georgia Department of Technical and Adult Education reviews the proposal using its established criteria for evaluating elective courses.

Electives are made available for the Biotechnology program and elective course work is included in the requirements for program graduation.

BIOTECHNOLOGY

PROGRAM STRUCTURE
(Course Transferability)

Standard Statement

Biotechnology program courses are transferable on the basis of their course identification code.

Explanatory Comment

Courses assigned identical course identification codes include consistent essential competency areas; therefore, resultant credits are guaranteed transferability between programs and institutions under the jurisdiction of the Georgia Board of Technical and Adult Education.

Courses that do not have an assigned course identification code but include similar essential competency areas are selectively transferable.

Evaluative Criteria

Biotechnology program courses assigned designated course identification codes are transferable between programs and institutions under the jurisdiction of the Georgia Board of Technical and Adult Education.

Courses taken outside the Georgia Technical and Adult Education system are selectively accepted for transfer on the basis of similarity in competency areas as determined by the Biotechnology program faculty and admissions officers.

Only those courses in which a grade of C or better was awarded are transferable.

BIOTECHNOLOGY

PROGRAM EVALUATION AND PLANNING
(Program Evaluation)

Standard Statement

A written evaluation procedure is developed and implemented for the Biotechnology program.

Explanatory Comment

Program evaluation procedures vary depending upon the nature of the institution and the program. The administration and program faculty, in association with the program advisory committee, develop and implement program evaluation procedures and data collection techniques that are reasonable and realistic for yearly evaluation purposes.

Biotechnology program faculty and administrative personnel work together to determine student enrollment, attrition, graduation, placement, and performance levels.

Evaluative Criteria

A procedure for continuous Biotechnology program evaluation is developed and implemented by the administration of the institution, the program faculty, and the program advisory committee. Formal evaluation of the Biotechnology program is conducted and documented annually.

The Biotechnology program evaluation procedure is used to determine the extent to which program goals and objectives are achieved.

The Biotechnology program evaluation results are used to determine the adequacy of the existing program to meet current occupational needs.

The Biotechnology program evaluation procedure is used to ascertain the consistency of the philosophy, purpose, goals, and objectives of the program with those of the institution, the Georgia Board of Technical and Adult Education, and the designated accrediting agency(ies).

The Biotechnology program evaluation procedure includes review of student program evaluations, enrollment, attrition, graduation, placement, and student performance levels.

BIOTECHNOLOGY

The Biotechnology program evaluation procedure includes consultation with the program advisory committee, frequent communication with employers, analysis of placement and follow-up data, and collection of other information to evaluate and document program relevance.

Biotechnology program evaluation results are used to plan program improvements.

BIOTECHNOLOGY

PROGRAM EVALUATION AND PLANNING
(Program Planning)

Standard Statement

A written planning procedure is developed and implemented for the Biotechnology program.

Explanatory Comment

The Biotechnology program planning procedure allows responsiveness to the changing needs of the community and employment market.

The Biotechnology program is evaluated at the institutional level by the students, instructors, program advisory committee, and administration; from this documented data, short-range and long-range program planning is developed.

Evaluative Criteria

A Biotechnology program planning procedure is developed and implemented by the administration of the institution and program faculty. Formal planning for the Biotechnology program is conducted and documented annually.

The Biotechnology program planning procedure utilizes program evaluation results to facilitate provision of program offerings of sufficient quality and scope to meet community and employment market needs.

The Biotechnology program planning procedure considers recommendations for program and course continuation, addition, deletion, and/or modification based on needs assessment information and input from the administration of the institution, the program faculty, and the advisory committee.

The Biotechnology program planning procedure considers information from appropriate national, state, and local governmental and non-governmental agencies.

The Biotechnology program planning procedure considers information such as demographic studies, occupational surveys, current curricula, cost estimates, instructor availability, equipment needs, and projected enrollment figures that include special populations.

BIOTECHNOLOGY

The Biotechnology program planning procedure satisfies the program planning requirements of the designated accrediting agency(ies).

BIOTECHNOLOGY

PROGRAM EVALUATION AND PLANNING
(Enrollment, Graduation, and Placement Levels)

Standard Statement

An evaluation of the enrollment, graduation, and placement levels of the Biotechnology program is conducted.

Explanatory Comment

Acceptable Biotechnology program outcomes (enrollment, graduation, and placement levels) are identified in the Evaluation, Planning, and Budgeting (EPB) model.

Evaluative Criteria

Annual evaluation of Biotechnology program enrollment, graduation, and placement statistics is conducted and documented by the administration and program faculty.

Biotechnology program evaluation findings are compared with acceptable outcome levels designated for state evaluation requirements.

Factors contributing to the outcomes of the Biotechnology program are identified and analyzed. Where enrollment, graduation, and/or placement levels are unacceptable, appropriate corrective action is taken.

BIOTECHNOLOGY

PROGRAM EVALUATION AND PLANNING
(Attrition Levels)

Standard Statement

An analysis of the attrition level of the Biotechnology program is conducted and used in evaluating and improving the program.

Explanatory Comment

Attrition level is a measure of the number of students who withdraw from a program prior to completion of graduation requirements.

Attrition levels vary from one type of program to another depending on the nature of the program and the student population. The attrition level of the Biotechnology program is compared with relevant, available national norms and other data.

Evaluative Criteria

Annual evaluation of the attrition level of the Biotechnology program is conducted and documented by the program faculty.

Factors contributing to the attrition level are identified and analyzed, and appropriate corrective action is taken.

BIOTECHNOLOGY

PROGRAM EVALUATION AND PLANNING
(Student Performance)

Standard Statement

An evaluation of the Biotechnology program is conducted based on student achievement levels.

Explanatory Comment

Achievement levels are evaluated on the basis of verified student performance related to academic knowledge, occupational/technical knowledge, and performance skills.

Student achievement levels for the Biotechnology program are determined on the basis of student performance data gathered from tests which are locally developed and conducted during each program of study.

Evaluative Criteria

Annual evaluation of Biotechnology program student achievement levels is conducted and documented by the administration and program faculty.

Factors contributing to student achievement levels are identified and analyzed. Where achievement is low, corrective action is taken to improve the program.

BIOTECHNOLOGY

INSTRUCTIONAL PROGRAM
(Course Content)

Standard Statement

The essential content of each Biotechnology course is consistent statewide for courses having the same course identification code.

Explanatory Comment

Course content is defined in terms of competency areas taught. The program-specific standards of the Georgia Board of Technical and Adult Education detail the essential competency areas for each course identification code.

Evaluative Criteria

The content of each Biotechnology course having a given course identification code includes, but is not limited to, essential competency areas identified for that course identification code.

Competency areas included in the Biotechnology course content reflect advances in the subject area and occupational field and respond to student, community, and employment market needs.

The overall content of each Biotechnology course is consistent with established program goals and objectives.

BIOTECHNOLOGY

INSTRUCTIONAL PROGRAM
(Course Objectives)

Standard Statement

Each Biotechnology program course is constructed on the basis of course objectives.

Explanatory Comment

Course objectives are desired student performance outcomes stated in measurable performance terms.

The Biotechnology program faculty coordinates the planning of course objectives, outlines, and syllabi in an effort to facilitate program efficiency and consistency.

Evaluative Criteria

The objectives of each Biotechnology course are derived from established program objectives.

Biotechnology course outlines and lesson plans are based on course objectives.

BIOTECHNOLOGY

INSTRUCTIONAL PROGRAM
(Course Instruction)

Standard Statement

Suitable instructional techniques and resources facilitate the fulfillment of Biotechnology course objectives.

Explanatory Comment

A wide variety of instructional techniques and resources are used to direct student learning experiences.

Evaluative Criteria

Course outlines, syllabi, and group or individual lesson preparations serve to organize instruction in each Biotechnology classroom and laboratory.

Instructional materials such as competency tests, text books, instruction sheets, audiovisuals, and computer programs are utilized to meet Biotechnology program goals and objectives and enhance instructional effectiveness.

Teaching methods, materials, and procedures make provisions for individual differences, needs, and capabilities. Opportunities for remediation are provided to students as needed.

Student learning experiences include theoretical instruction and practical application of knowledge. The ratio of theoretical to practical instruction depends on the nature of program competencies.

Student progress is systematically monitored, evaluated, and recorded by the Biotechnology program faculty as part of the instructional process.

Desirable employability skills are integrated into Biotechnology course instruction and are modeled by the instructor.

Collegiate academic skills are integrated into Biotechnology course instruction and are modeled by the instructor.

BIOTECHNOLOGY

A syllabus which outlines course objectives, requirements, content, and evaluation techniques is made available to students enrolled in each Biotechnology course.

Instructional methods are evaluated routinely, and evidence of improvement is collected and documented by the Biotechnology program faculty.

BIOTECHNOLOGY

INSTRUCTIONAL PROGRAM
(Occupation-Based Instruction)

Standard Statement

The Biotechnology program offers effective occupation-based instructional delivery where appropriate.

Explanatory Comment

Occupation-based instructional delivery systems include educational work experiences, internships, practicums, and other specialized and/or innovative learning arrangements.

Degree programs that require internships, work experience arrangements, and/or other occupation-based instructional experiences do so on the basis of designated essential competency areas and courses for the given program.

Evaluative Criteria

Any internship, on-the-job training arrangement, or other educational work experience that is a Biotechnology program requirement or elective is:

a) listed as a course having a course identification code;
b) assigned course credit and required tuition;
c) defined by the same requirements for statewide course title, essential course description, and essential competency areas as any other diploma/degree program course;
d) controlled and supervised by the institution, Biotechnology program faculty, and/or the person designated to coordinate work experience courses; and
e) managed through the use of prescribed individual training plans that detail required student learning and performance objectives and appropriate agreements between institutions and work experience supervisors.

BIOTECHNOLOGY

INSTRUCTIONAL PROGRAM
(Evaluation of Students)

Standard Statement

A system for evaluation of students is developed and implemented by the Biotechnology program faculty.

Explanatory Comment

Evaluation of students is based on tests, observations, records, interviews, homework, projects, and/or other evidence of student performance.

Evaluative Criteria

The Biotechnology program system for evaluation of students is consistent with institutional grading policies.

The faculty of the Biotechnology program develops, implements, and disseminates a written system for evaluation of students.

The Biotechnology program system for evaluation of students reflects the philosophy, purpose, goals, and objectives of the program.

The Biotechnology program system for evaluation of students requires use of competency-based measures of student performance.

The Biotechnology program system for evaluation of students requires use of both formative and summative evaluation.

The Biotechnology program system for evaluation of students includes evaluation and documentation of student achievement in both course specific knowledge and practical application.

The Biotechnology program system for evaluation of students includes evaluation and documentation of student achievement in the cognitive, affective, and psychomotor domains.

BIOTECHNOLOGY

The Biotechnology program system for evaluation of students is reviewed annually and revised, as necessary.

BIOTECHNOLOGY

INSTRUCTIONAL PROGRAM
(Grading System)

Standard Statement

The Biotechnology program implements statewide grading standards.

Explanatory Comment

Program grading systems vary in detail but are consistent regarding major principles.

Evaluative Criteria

The faculty of the Biotechnology program develops, implements, and disseminates a written grading system that incorporates statewide grading standards.

The grading system reflects the objectives of the Biotechnology program.

The grading system of the Biotechnology program is used to promote student awareness of learning progress.

The grading system of the Biotechnology program bases grades in occupational courses on documented measures of student knowledge, practical application of knowledge, and employability skills.

The grading system of the Biotechnology program establishes passing grades that document student achievement of course competencies at levels acceptable for job entry.

The grading system of the Biotechnology program requires use of a grading scale whereby 90 to 100% is an A, 80 to 89% is a B, 70 to 79% is a C, 65 to 69% is a D, and 0 to 64% is an F.

The grading system of the Biotechnology program recommends the minimum course grade of C for progress from specified courses to more advanced courses.

The grading system of the Biotechnology program is evaluated annually by the program faculty and revised, as needed.

BIOTECHNOLOGY

INSTRUCTIONAL PROGRAM
(Laboratory Management)

Standard Statement

A system for instructional laboratory management is developed and implemented by the faculty of the Biotechnology program.

Explanatory Comment

An established laboratory management system facilitates productive instructional laboratory operation.

Evaluative Criteria

The faculty of the Biotechnology program develops and implements a written laboratory management system.

The laboratory management system is disseminated to Biotechnology program students and faculty.

Institutional policies regarding safety, liability, and laboratory operation are reflected in the Biotechnology program laboratory management procedure.

The Biotechnology program laboratory management system is consistent with the goals and objectives of the program.

The Biotechnology program laboratory management system maximizes the instructional usefulness of student laboratory experiences. The laboratory management system is designed to meet student needs in learning program competencies.

The Biotechnology program laboratory management system complies with and stresses safety practices, requires that safety instruction precede laboratory instruction, and establishes required safety tests.

The Biotechnology program laboratory management system is developed using input from program faculty, advisory committee members, and, when possible, students.

The laboratory management system is evaluated annually and revised, as needed.

BIOTECHNOLOGY

INSTRUCTIONAL PROGRAM
(Equipment, Supplies, and Materials)

Standard Statement

The furnishings, equipment, supplies, and materials for the Biotechnology program are sufficient, appropriate, and adequately maintained to support safe and effective instruction.

Explanatory Comment

Program equipment, supplies, and materials include items used in a given occupation and items used in the delivery of instruction.

Evaluative Criteria

Current and adequately maintained furnishings, equipment, supplies, and materials are available to meet the instructional goals and performance objectives of the Biotechnology program.

Students in the Biotechnology program are helped to develop transferable occupational skills by using instructional equipment, tools, materials, and supplies that are comparable to those currently used in the occupational field. Tools and equipment reflect industry quality standards.

The furnishings, equipment, supplies, and materials used in the Biotechnology program meet or exceed applicable local, state, and federal health and safety standards.

The Biotechnology program makes provisions to ensure that all health and safety equipment, machine guards, fixtures, materials, and supplies required by local codes, state law, and professional practice are available and maintained in working order.

The Biotechnology program requires that applicable personal safety devices, equipment, and supplies are available, utilized, and maintained in working order.

First aid supplies appropriate for the Biotechnology program are available throughout each program area.

Biotechnology program equipment, supplies, and materials are installed, color coded, controlled, ventilated, and/or stored in accordance with applicable health and safety codes.

BIOTECHNOLOGY

The Biotechnology program implements an equipment, materials, and supplies management system that delineates proper procedures for purchasing, maintaining, locating, storing, inventorying, securing, distributing, repairing, replacing, and safely using instructional items.

The Biotechnology program utilizes its advisory committee and other inputs in implementing annual evaluation and planning procedures to maintain or improve the adequacy, safety, and management of equipment, materials, and supplies.

BIOTECHNOLOGY

INSTRUCTIONAL PROGRAM
(Physical Facility)

Standard Statement

The Biotechnology program is provided with adequate and appropriate facilities.

Explanatory Comment

The facilities for the Biotechnology program vary depending on enrollments, learning activities involved, instructional equipment used, indoor and/or outdoor instruction involved, and other factors.

Evaluative Criteria

Space allocations for the Biotechnology program are appropriate for the number of students enrolled and the type of instructional activity involved.

The physical facilities for the Biotechnology program are designed to facilitate instructional delivery, allow program flexibility, accommodate instructional management, protect students and staff against safety hazards, protect equipment from loss or damage, provide accessibility to all students, and create a positive atmosphere for effective learning.

The physical facilities for the Biotechnology program are arranged to separate noise-producing activities from those that require a quiet environment, to expedite student traffic flow, and to prevent disruption of instruction.

Water, electricity, and other utilities are safely and conveniently provided to the Biotechnology program on the basis of instructional needs.

The Biotechnology program is provided with lighting, heating, cooling, ventilation, and any specialized control systems needed to maintain healthy and safe working conditions and meet instructional requirements.

The physical facilities for the Biotechnology program include classrooms, laboratories, and/or other specialized learning areas needed to meet instructional requirements.

BIOTECHNOLOGY

The institution provides adequate and appropriate non-instructional facilities including offices, restrooms, storage areas, and any other specialized areas needed to meet Biotechnology program needs.

The facilities for the Biotechnology program are maintained regularly and operated effectively and cost efficiently.

The Biotechnology program faculty and advisory committee conduct an annual facility evaluation which contributes to the overall institutional facility review process.

BIOTECHNOLOGY

ACADEMIC SKILLS
(Academic Requirements)

Standard Statement

Academic achievement standards are established for the Biotechnology program.

Explanatory Comment

Examples of academic skills include, but are not limited to, communication skills, reading comprehension skills, and computation skills.

Developmental studies assists students to improve skills such as language usage, reading, and computation prior to regular program admission.

Evaluative Criteria

The Biotechnology program utilizes academic achievement standards for admission that reflect skills necessary for successful participation in the instructional program.

The institution offers developmental studies to students who do not meet academic achievement standards for program admission.

The institution offers a required general core curriculum consisting of college level academic instruction.

Opportunities for academic remediation are provided to students while enrolled in Biotechnology program courses.

The Biotechnology program utilizes academic evaluation achievement standards that reflect skills necessary for successful performance on the job.

Where a state-approved evaluation has not been established, evaluation of essential academic skills is conducted according to standards developed by the local program faculty.

BIOTECHNOLOGY

EMPLOYABILITY SKILLS
(Job Acquisition)

Standard Statement

Job acquisition competency areas are integrated into the curriculum of the Biotechnology program.

Explanatory Comment

Employability skills refer to the basic academic, interpersonal, reasoning, problem solving skills, and work ethics that, when transferred to the occupational settings, facilitate job acquisition, retention, and advancement.

Job acquisition competency areas consist of essential employability skills that directly influence the ability to obtain employment.

Evaluative Criteria

The Biotechnology program faculty ensures that job acquisition competency areas are included in the curriculum.

Job acquisition competency areas include, but are not limited to, the following:
a) job search;
b) job application and resume preparation;
c) interviewing; and
d) job marketing.

The Biotechnology program faculty utilizes job follow-up data, current research, and the expertise of the program advisory committee to evaluate and update the delivery of program employability skills training.

The Biotechnology program faculty assists in providing student employment information to the job placement office.

The Biotechnology program faculty encourages and guides students in preparing occupationally appropriate job acquisition materials such as applications, resumes, letters of reference, work histories, course descriptions or outlines, transcripts, and other related information.

BIOTECHNOLOGY

The media collection includes multi-media employability information appropriate for classroom and individual student use.

BIOTECHNOLOGY

EMPLOYABILITY SKILLS
(Job Retention and Advancement)

Standard Statement

Job retention and advancement competency areas are integrated into the curriculum of the Biotechnology program.

Explanatory Comment

Employability skills refer to the basic academic, interpersonal, reasoning, problem solving skills, and work ethics that, when transferred to the occupational settings, facilitate job acquisition, retention, and advancement.

Job retention and advancement competency areas consist of desirable job performance skills and attitudes that directly influence the ability to maintain employment or achieve an improved employment role. Included within this definition are such behaviors as punctuality, initiative, integrity, honesty, productivity, cooperativeness, tactfulness, ability to respond to supervision, follow directions, adhere to policies/regulations, proper utilization of tools and resources, and observance of safety provisions.

Evaluative Criteria

The administration and faculty of the Biotechnology program ensures that job retention and advancement competency areas are included in the curriculum through implementation of the following essential components of a work ethics program:

a) demonstrated commitment of administration and faculty;
b) involvement of business/industry;
c) timely and effective explanation to students;
d) uniform system for student evaluation within each institution;
e) appropriate student/teacher interaction;
f) consistent monitoring by instructional supervisor;
g) inclusion of a work ethics grade displayed on the official student record/transcript indicating the extent to which appropriate work habits are demonstrated in student performance in shop, laboratory, and certain other designated courses; and
h) maintenance of appropriate documentation.

The grades assigned for work ethics shall not be utilized in calculating the student's grade point average.

BIOTECHNOLOGY

STAFF
(Faculty Qualifications and Responsibilities)

Standard Statement

Qualified faculty are responsible for carrying out the purpose, goals, and objectives of the Biotechnology program.

Explanatory Comment

Essential faculty qualifications and responsibilities are detailed in the Certification Manual and the program-specific standards established by the Georgia Board of Technical and Adult Education.

Evaluative Criteria

The qualifications for each Biotechnology program part-time or full-time faculty member meet the requirements specified in the Certification Manual of the Georgia Board of Technical and Adult Education, as appropriate, and the requirements of the designated accrediting agency(ies).

The responsibilities of each Biotechnology program part-time or full-time faculty member are in compliance with the requirements specified in the Georgia Board of Technical and Adult Education Policy Manual and are in conformance with the requirements of the designated accrediting agency(ies).

The faculty of the Biotechnology program use annual staff development opportunities to assure achievement of occupational and instructional competency.

BIOTECHNOLOGY

ADVISORY COMMITTEE
(Function)

Standard Statement

A program advisory committee provides expert support for the Biotechnology program.

Explanatory Comment

A program advisory committee is established to promote interaction between the Biotechnology program and businesses and industries served by the program.

Faculty use the expertise of the advisory committee to improve program content and operation.

Evaluative Criteria

The Biotechnology program advisory committee assists with developing short-range and long-range plans.

The Biotechnology program advisory committee provides advice regarding curriculum content to ensure that courses relate to present and future employment needs.

The Biotechnology program advisory committee makes suggestions regarding the modification, addition, or deletion of course offerings.

The Biotechnology program advisory committee supports the program through public relations activities.

The Biotechnology program advisory committee makes recommendations regarding the design and use of physical facilities.

The Biotechnology program advisory committee makes recommendations regarding the selection and maintenance of equipment.

The Biotechnology program advisory committee assists in evaluation of program effectiveness, job development, job placement, program promotion, evaluation in relation to standards, program advocacy, and industrial support of the program.

BIOTECHNOLOGY

The Biotechnology program advisory committee submits its recommendations regarding program related changes to the appropriate state-level technical committee for review on an annual basis.

The Biotechnology program faculty provides documented evidence that program advisory committee recommendations are considered and that specific action is taken on each recommendation.

BIOTECHNOLOGY

ADVISORY COMMITTEE
(Membership)

Standard Statement

The membership of the Biotechnology program advisory committee is representative of the community and employment market served by the program.

Explanatory Comment

The Biotechnology program advisory committee is composed primarily of persons in the industry served by the program and includes persons within the community and employment market who positively impact the program.

Evaluative Criteria

The faculty of the Biotechnology program, in cooperation with the administration of the institution, selects the advisory committee.

The Biotechnology program advisory committee includes a cross-section of representatives from program-related businesses and industries.

The Biotechnology program advisory committee includes program-related business and industry representatives who have varying occupational positions.

The Biotechnology program advisory committee includes faculty as ex officio members.

The Biotechnology program advisory committee is composed of a minimum of five members.

The Biotechnology program advisory committee maintains a base of experienced members while acquiring new members.

The Biotechnology program advisory committee members are recognized for their dedication and effort to improve the quality of education.

BIOTECHNOLOGY

ADVISORY COMMITTEE
(Meetings)

Standard Statement

Biotechnology program advisory committee meetings have a planned program of work.

Explanatory Comment

Regularly scheduled formal advisory committee meetings focus on planning, developing, implementing, and evaluating the Biotechnology programs.

Evaluative Criteria

The Biotechnology program advisory committee has an annual program of work on file.

The Biotechnology program advisory committee meets a minimum of two times annually on a scheduled basis.

The Biotechnology program advisory committee elects officers, including a chairperson and a secretary.

The Biotechnology program advisory committee follows an agenda which is distributed to members prior to each meeting.

The chairperson of the Biotechnology program advisory committee assists program faculty in developing the agenda for each meeting.

The Biotechnology program advisory committee maintains minutes indicating date, agenda, members present, and recommendations.

Minutes are distributed to each Biotechnology program advisory committee member prior to each meeting.

The Biotechnology program advisory committee maintains an open file of minutes and other necessary documents for a minimum of three years.

BIOTECHNOLOGY

The Biotechnology program advisory committee members are invited to make periodic classroom visits to the institution.

The Biotechnology program advisory committee has a quorum present to conduct business.

BIOTECHNOLOGY

SPECIAL NEEDS
(Commitment)

Standard Statement

The Biotechnology program is committed to providing technical education to special needs students.

Explanatory Comment

Special needs students are those who are academically and/or economically disadvantaged, are physically and/or mentally handicapped, or are national origin minority students with limited English language skills.

The special needs requirements of the Georgia Board of Technical and Adult Education meet or exceed all relevant local, state, and federal legislation.

Special needs legislation includes, but is not limited to, mandates for auxiliary aids to students, removal of architectural and equipment barriers, and non-restrictive career counseling.

Evaluative Criteria

Special needs policies and operational procedures that comply with current local, state, and federal special needs legislation are implemented in the Biotechnology program.

Students who are academically and/or economically disadvantaged are provided special services and assistance to enable them to succeed in the Biotechnology program.

Students who have physical and/or mental impairments are provided special services and assistance to enable them to succeed in the Biotechnology program.

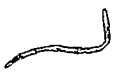
Students who are national origin minority students with limited English language skills are provided special services and assistance to enable them to succeed in the Biotechnology program.

Biotechnology program faculty are prepared, through staff development education, to provide assistance for students with special needs.

BIOTECHNOLOGY

All special needs personnel meet Georgia Board of Technical and Adult Education certification requirements.

Course objectives within the Biotechnology program are utilized as the basis for developing an Individualized Education Program (IEP) for each handicapped student under 21 years of age enrolled in the program.



BIOTECHNOLOGY

EQUITY
(Commitment)

Standard Statement

The Biotechnology program affords equal access and opportunities to all qualified students and staff.

Explanatory Comment

Equal access and equal opportunity refer to the prohibition of discrimination on the basis of race, color, national origin, religion, sex, age, or handicapping condition in educational programs, activities, and employment.

The equal access and equal opportunity requirements of the Georgia Board of Technical and Adult Education meet or exceed all relevant state and federal legislation.

Equal access and equal opportunity legislation includes, but is not limited to, mandates for: equitable admissions practices, counseling, employment, grievance procedures, and leave; nondiscriminatory recruitment and promotional materials; and public notification of nondiscrimination.

Evaluative Criteria

The nondiscrimination commitment of the Biotechnology program complies with current Georgia Board of Technical and Adult Education policy and state and federal law.

A written institutional policy that ensures equal access to all qualified students who can safely benefit from instructional services regardless of race, color, national origin, religion, sex, age, or handicapping condition is implemented in the Biotechnology program.

BIOTECHNOLOGY

HEALTH AND SAFETY
(Commitment)

Standard Statement

The Biotechnology program provides a safe and healthy environment for students and staff.

Explanatory Comment

References for proper health and safety conditions, equipment, practices, and procedures are available in Georgia Board of Technical and Adult Education policy and local, state, and federal law. Emergency and disaster plans, accident reports, and fire drill procedures are outlined in information from the State Fire Marshall's Office, the Civil Defense Division, and the Georgia Department of Human Resources.

Health and safety facility and equipment provisions required by the Georgia Board of Technical and Adult Education meet or exceed appropriate local, state, and federal law.

Evaluative Criteria

The physical facility, furnishings, equipment, supplies, and practices of the Biotechnology program meet or exceed appropriate local, state, and federal health and safety standards.

Proper health and safety practices are developed, implemented, and integrated into the Biotechnology program.

The Georgia Board of Technical and Adult Education does not discriminate on the basis of age, sex, race, color, religion, national origin, or handicap in its educational programs, activities, or employment policies.