

Bioscience Technology (BSC)

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Bioscience technicians perform procedures in chemical and biotechnology laboratories, pharmaceutical manufacturing facilities, and research laboratories. Advanced skills in biology and chemistry, microbiology, and laboratory skills are important for a successful career in bioscience or biotechnology.

Students who successfully complete the Bioscience Technology program at Cincinnati State earn an Associate of Applied Science degree. The curriculum prepares graduates for entry-level employment in bioscience or biotechnology, or for transfer to a four-year institution to pursue a bachelor's degree in biological science or related fields. Students entering the program should have a strong background in or aptitude for the sciences, a willingness to follow structured methods, ability to explore molecules and cells, and a desire to help people and enhance the world through the use of biotechnology.

Bioscience Certificate (BSCC)

The Bioscience Certificate is designed for someone with a desire to learn the basics of the biotechnology field, either as an add-on to another degree or as a new career path. The certificate curriculum contains less rigorous biology and chemistry requirements than the degree program, but has most of the same laboratory courses. Students learn genetic engineering, DNA forensics, aseptic technology and microbiology basics, protein isolation techniques, protein and DNA electrophoresis, PCR technology, and more.

Bioscience employees are expected to pay attention to cleanliness, detail, and protocol; have background in biology and science concepts; and have good communication skills. Graduates may be hired as laboratory assistants using equipment specific to the biotechnology field, or as technicians in bio-manufacturing industries.

Bioscience Technology (BSC)

All degree-seeking students must complete a First Year Experience (FYE) course as part of the first 12 credit hours taken at Cincinnati State.

Program Prerequisite: IM 111 Computer Applications 1 or appropriate computer literacy placement test score

Semester 1		Lec	Lab	Credits
ENG 101	English Composition 1	3	0	3
BSC 105	Laboratory Skills for Bioscience	2	3	3
BSC 110	Biomanufacturing Workplace Regulations	3	0	3
BIO XXX Biology Sequence Elective 1				4
Semester 2				
BSC 115	Bioscience Laboratory Methods	2	3	3
MAT 151	College Algebra	4	0	4
BIO XXX Biology Sequence Elective 2				4
CHE XXX Chemistry Elective				4
Semester 3				
COMM 110	Public Speaking	3	0	3
XXX XXX Bioscience Elective				2
ENG XXX English Composition Elective				3
XXX XXX Humanities/Social Sciences Elective 1				3
Semester 4				
IM 120	Electronic Spreadsheets: Microsoft Excel	2	3	3
BSC 150	Scientific Literacy for Bioscience	2	0	2

BSC 205	Molecular Genetics Laboratory	2	6	5
CHE XXX Organic Chemistry Elective				4
Semester 5				
BSC 210	Protein Purification and Analysis	2	6	5
XXX XXX Humanities/Social Sciences Elective 2				3
MAT XXX Mathematics Elective				3
BIO XXX Advanced Biology Elective				3
Semester 6				
BSC XXX Bioscience Experiential Learning Elective				2
Total Credits:		25	21	69

Electives

Biology Sequence Electives

Select one of the following:

BIO 111 & BIO 112 Biology: Unity of Life and Biology: Diversity of Life

BIO 131 & BIO 132 Biology 1 and Biology 2 ¹

Chemistry Elective

Select one of the following:

CHE 110 Fundamentals of Chemistry

CHE 121 & CHE 131 & CHE 122 & CHE 132 General Chemistry 1 and General Chemistry 1 Lab and General Chemistry 2 and General Chemistry 2 Lab ¹

Bioscience Electives

BSC 120	Cell Culture	2
BSC 160	Quality and Compliance in Biomanufacturing	3
BSC 230	Introduction to Bioinformatics	3
MET 230	Quality Control and Six Sigma	4
EVT 168	Radiation Safety	2
EVT 170	Water and Wastewater Treatment and Analysis	4

English Composition Elective

ENG 102	English Composition 2: Contemporary Issues	3
ENG 103	English Composition 2: Topics in Literature	3
ENG 104	English Composition 2: Technical Communication	3
ENG 105	English Composition 2: Business Communication	3

Humanities/Social Sciences Electives

CULT 105 or CULT 110	Issues in Human Diversity Social Issues in Technology	3
PHI 110	Ethics	3
PSY 100 or PSY 102 or PSY 110	Applied Psychology: Human Relations Applied Psychology: Stress Management Introduction to Psychology	3
SOC 100 or SOC 105	Survey of Social Issues Introduction to Sociology	3

Organic Chemistry Elective

Select one of the following:

CHE 111	Bio-Organic Chemistry	
CHE 201 & CHE 211 & CHE 202 & CHE 212	Organic Chemistry 1 and Organic Chemistry 1 Lab and Organic Chemistry 2 and Organic Chemistry 2 Lab ¹	
Mathematics Elective		
MAT 131 or MAT 153	Statistics 1 Pre-Calculus	3
Advanced Biology Elective		
BIO 115	Human Genetics	3
BIO 250	Cell Biology	5
BIO 260	Genetics	5
BIO 270	Ecology	5
BIO 275	Animal Behavior	5
Bioscience Experiential Learning Elective		
BSC 280	Bioscience Capstone Project	2
BSC 191	Part-Time Cooperative Education 1: Bioscience	1
BSC 291	Full-Time Cooperative Education 1: Bioscience	2
BSC 294	Internship 1: Bioscience	2

¹ recommended for students planning to continue in a bachelor's degree science program

Bioscience Certificate

All certificate-seeking students must complete a First Year Experience (FYE) course as part of the first 12 credit hours taken at Cincinnati State.

Program Prerequisites: MAT 150 Intermediate Algebra (minimum grade C) or appropriate placement test score, and IM 111 Computer Applications 1 or appropriate computer literacy placement test score.

Semester 1		Lec	Lab	Credits
BSC 105	Laboratory Skills for Bioscience	2	3	3
BSC 110	Biomanufacturing Workplace Regulations	3	0	3
BIO 111	Biology: Unity of Life	3	2	4
IM 120	Electronic Spreadsheets: Microsoft Excel	2	3	3
MAT 151	College Algebra	4	0	4
Semester 2				
CHE 110	Fundamentals of Chemistry	3	3	4
COMM 110	Public Speaking	3	0	3
BSC 115	Bioscience Laboratory Methods	2	3	3
BSC 280	Bioscience Capstone Project	0	4	2
Total Credits:		22	18	29

Courses

BSC 100 Survey of Bioscience and Biotechnology

2 Credits. 2 Lecture Hours. 0 Lab Hour.

An introductory course on the disciplines and scope of bioscience and biotechnology. Topics include: applications of bioscience and biotechnology, medical advances, bioethics, current developments, and career opportunities.

Prerequisites: AFM 085 and AFM 095, or appropriate placement test scores

BSC 105 Laboratory Skills for Bioscience**3 Credits. 2 Lecture Hours. 3 Lab Hours.**

A course on skills required for safe and regulated work in a laboratory environment. Topics include: lab documentation, safety, measurements and calculations, making solutions, and aseptic technique.

Prerequisites: BIO 111, or AFL 085 and AFM 095 or appropriate placement test scores, and HS biology within the last 7 years (minimum grade C)

BSC 110 Biomanufacturing Workplace Regulations**3 Credits. 3 Lecture Hours. 0 Lab Hour.**

A course on the regulatory environment of biomanufacturing. Topics include: scope of the biomanufacturing industry; regulations such as CRF 21, GMP, GLP, and GCP; and writing and following SOPs, batch records, and FDA warning letters and 483 notices.

Prerequisites: AFL 085 and AFM 095, or appropriate placement test scores

BSC 115 Bioscience Laboratory Methods**3 Credits. 2 Lecture Hours. 3 Lab Hours.**

A course on techniques used in Bioscience laboratories. Topics include: microscopy, aseptic technique, growth and identification of microbes, spectroscopy, genetic transformation, DNA isolation, and troubleshooting experiments.

Prerequisites: BSC 105, and (BIO 111 or BIO 131), and CHE 100 or high school chemistry within the past 7 years and (ENG 101 or ENG REQ C) (minimum grade C for all)

BSC 120 Cell Culture**2 Credits. 0 Lecture Hour. 6 Lab Hours.**

A course on skills and techniques necessary to perform cell culture. Topics include: cell counts, biosafety, plant culture, yeast culture, mammalian cell culture, and fermentation techniques.

Prerequisites: BSC 115

BSC 150 Scientific Literacy for Bioscience**2 Credits. 2 Lecture Hours. 0 Lab Hour.**

A course on reading, writing, and speaking skills for science professionals. Topics include: style and structure for scientific journal articles, the peer review process, and oral presentations of scientific information.

Prerequisites: None

BSC 160 Quality and Compliance in Biomanufacturing**3 Credits. 3 Lecture Hours. 0 Lab Hour.**

A course on quality assurance elements in biomanufacturing industries. Topics include: current Good Manufacturing Practices (cGMPs), lean manufacturing and Six Sigma, root cause analysis, validation and calibration, and regulatory compliance. Students must attend field trips to local biomanufacturing companies.

Prerequisites: BSC 110

BSC 191 Part-Time Cooperative Education 1: Bioscience**1 Credit. 1 Lecture Hour. 20 Lab Hours.**

Students seeking an associate's degree participate in their first part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures in order to earn credit.

Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: BIO 132 and (BSC 205 or BSC 210) (minimum grade C for all)

BSC 198 First Year Special Topics in Bioscience**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A course on selected topics related to Bioscience, which gives students opportunities to study information not currently covered in other courses. Grades issued are A, B, C, D, or F.

Prerequisites: None

BSC 199 First Year Independent Project in Bioscience**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A project related to Bioscience that is completed by one or more students to meet specific educational goals. Projects must have prior approval and supervision by Bioscience faculty. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: Vary by section

BSC 205 Molecular Genetics Laboratory**5 Credits. 2 Lecture Hours. 6 Lab Hours.**

A course on molecular genetics techniques. Topics include: DNA and RNA isolation and purification, constructing screening libraries, electrophoresis, vector construction, Southern blot, PCR, DNA sequencing, and microarrays.

Prerequisites: BSC 115, and MAT 121 or MAT 151 (minimum grade C for all)

BSC 210 Protein Purification and Analysis**5 Credits. 2 Lecture Hours. 6 Lab Hours.**

A course on isolation, purification, and analysis of proteins from cells. Topics include: chromatography, electrophoresis, Western blot, enzyme assays, proteomics, ELISA and other immunochemistry methods for detecting proteins.

Prerequisites: BSC 115, and MAT 121 or MAT 151 (minimum grade C for all)

BSC 230 Introduction to Bioinformatics**3 Credits. 3 Lecture Hours. 0 Lab Hour.**

A course on computer applications, statistics, and genetics used in computational biology and bioinformatics. Topics include: the Human Genome and Human Proteome projects, multiple sequence analysis, genetic conditions and trends, and use of databases such as BLAST, FASTA, and Entrez.

Prerequisites: BIO 111 or BIO 131

BSC 280 Bioscience Capstone Project**2 Credits. 0 Lecture Hour. 4 Lab Hours.**

Students design and perform a project under the supervision of a Bioscience instructor. Topics include: planning a budget, and documenting project results.

Prerequisites: BIO 132, and (BSC 205 or BSC 210)

BSC 291 Full-Time Cooperative Education 1: Bioscience**2 Credits. 1 Lecture Hour. 40 Lab Hours.**

Students seeking an associate's degree participate in their first full-time field learning experience related to their degree. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: BIO 132 and (BSC 205 or BSC 210) (minimum grade C for all)

BSC 294 Internship 1: Bioscience**2 Credits. 1 Lecture Hour. 40 Lab Hours.**

Students seeking an associate's degree participate in their first unpaid field learning experience related to their degree. Students must follow applicable policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: BIO 132, BSC 205, or BSC 210 (minimum grade C for all)

BSC 298 Second Year Special Topics in Bioscience**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A course on selected topics related to Biology, which gives students opportunities to study information not currently covered in other courses. Grades issued are A, B, C, D, or F.

Prerequisites: None

BSC 299 Second Year Independent Project in Bioscience**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A project related to Bioscience that is completed by one or more students to meet specific educational goals. Projects must have prior approval and supervision by Bioscience faculty. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: Vary by section