

Biotechnology (Minor)

M.S. and Ph.D. minors in biotechnology are available to students who successfully complete at least eight credit hours in selected laboratory core courses and conduct their graduate thesis research in an area of biotechnology. At least one member of the student's thesis committee must be a member of the Biotechnology faculty. Research in biotechnology is focused in three main areas: recombinant DNA technology, bioprocessing/bioanalytical techniques, and in vitro culture techniques. The multidisciplinary nature of biotechnology means that a wide range of research topics and techniques are applicable.

Students wishing to pursue graduate studies leading to either a M.S. or Ph.D. minor in biotechnology must enroll and conduct their research in a participating department. For specific information about enrollment requirements, contact the participating departments of interest to you directly.

More Information

Biotechnology Minor Program Website (<https://biotech.ncsu.edu/minors-certificate/graduate-minor-requirements/>)

Applicant Information

Delivery Method: On-campus

Entrance Exam:

Interview Required:

Master's Minor Plan Requirements

Code	Title	Hours	Counts towards
Required Course			4
BIT 510	Core Technologies in Molecular and Cellular Biology		
OR if approved by the Director of the Biotechnology Program, can be waived and replaced by 4 credits of BIT lab modules			
Elective Courses			4
Select two of the following:			
BIT 564	Protein Purification		
BIT 571	RNA Interference and Model Organisms		
BIT 573	Protein Interactions		
BIT 574	Plant Genetic Engineering		
BIT 577	Metagenomics		
BIT 579	High-Throughput Discovery		
BIT 580	Yeast Metabolic Engineering		

BIT 582 Virus Biotechnology: Pathogens to Therapeutics

New laboratory modules are offered every year as BIT 595 Special Topics. Currently offered lab modules include:

BIT 595 Special Topics (Introduction to Biological Electron Microscopy Techniques)

BIT 595 Special Topics (Deep Sequencing Analysis)

BIT 595 Special Topics (Cancer Drug Discovery and Development)

BIT 595 Special Topics (Experimental Assay Design)

BIT 595 Special Topics (DNA Forensics)

BIT 595 Special Topics (Gene Manipulation in Zebrafish)

BIT 595 Special Topics (Genome Editing: CRISPR Technology)

BIT 595 Special Topics (Illuminating Disease with Chemical Biology)

BIT 595 Special Topics (Microbiomes: From Sampling to Community Analysis)

BIT 595 Special Topics (Portable Genome Sequencing)

BIT 595 Special Topics (Protein & Metabolic Engineering by Directed Evolution)

BIT 595	Special Topics (Flying Beyond the Transcriptome: Transcriptional Regulation and Gene Networks)
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Additional courses

Select at least one credit from a life science-related course (including BIT lab modules) to be approved by the Director of the Biotechnology Program or from the BIT classes listed below:

BIT 502	Biotechnology Networking and Professional Development	1
BIT 811	Molecular Biotechnology Professional Development	
BIT 812	Capstone Biotechnology	
BIT 813	Research Ethics in Biotechnology	
BIT 814	Rigor & Reproducibility in Research	

Total Hours **9**

Doctoral Minor Plan Requirements

Code	Title	Hours	Counts towards
Required Course		4	

BIT 510	Core Technologies in Molecular and Cellular Biology
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OR if approved by the academic advisor of the Biotechnology Program, can be waived and replaced by 4 credits of BIT lab modules (see below)

Elective Courses **4**

Select two of the following:

BIT 564	Protein Purification
BIT 571	RNA Interference and Model Organisms
BIT 573	Protein Interactions
BIT 574	Plant Genetic Engineering
BIT 577	Metagenomics
BIT 579	High-Throughput Discovery

BIT 580	Yeast Metabolic Engineering
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BIT 815	Advanced Special Topics (Professional Development)
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BIT 582	Virus Biotechnology: Pathogens to Therapeutics
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New laboratory modules are offered every year as BIT 595 Special Topics. Currently offered lab modules include:

BIT 595	Special Topics (Introduction to Biological Electron Microscopy Techniques)
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BIT 595	Special Topics (Deep Sequencing Analysis)
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BIT 595	Special Topics (Cancer Drug Discovery and Development)
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BIT 595	Special Topics (Experimental Assay Design)
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BIT 595	Special Topics (DNA Forensics)
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BIT 595	Special Topics (Gene Manipulation in Zebrafish)
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BIT 595	Special Topics (Genome Editing: CRISPR Technology)
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BIT 595	Special Topics (Illuminating Disease with Chemical Biology)
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BIT 595	Special Topics (Microbiomes: From Sampling to Community Analysis)
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BIT 595	Special Topics (Portable Genome Sequencing)
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BIT 595	Special Topics (Protein & Metabolic Engineering by Directed Evolution)
BIT 595	Special Topics (Flying Beyond the Transcriptome: Transcriptional Regulation and Gene Networks)

Additional courses	4
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Select at least four credits from a 500-level or higher life science-related course (including additional BIT elective courses) to be approved by the Director of the Biotechnology Program or from the BIT classes listed below:

BIT 811	Molecular Biotechnology Professional Development
BIT 812	Capstone Biotechnology
BIT 813	Research Ethics in Biotechnology
BIT 814	Rigor & Reproducibility in Research

Total Hours	12
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Full Professor

Robert M. Kelly

Associate Professors

Caroline Laplante

Petra Bizikova

Glenn P. Cruse

Mary Elting

Manuel Kleiner

Laurianne Chantal Van Landeghem

Kelly Meiklejohn

Santosh Mishra

Brina Mortensen Montoya

Benjamin J. Reading

Lauren V. Schnabel

Assistant Professors

Christa Baker

Nathan Crook

Natalia Duque-Wilckens

Sharonda Latrice Johnson LeBlanc

Wusheng Liu

Michael Rahe

Kasie Raymann

Maria L. Rodgers

Breanna Jo Sheahan

Jack Wang

Xiaoqiu Wang

Justin Whitehill

Yang Zhang

Teaching Associate Professors

Carlos C. Goller

Melissa Srougi

Teaching Assistant Professor

Stefanie Chen