# 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:** None
- **Interview Required:** None

**Master's Minor Plan Requirements**

| Code | Title | Hours |
|---|---|---|
| **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) | |
| **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: | | 1 |
| BIT 502 | Biotechnology Networking and Professional Development | |
| 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 |
|---|---|---|
| **Required Course** | | **4** |
| BIT 510 | Core Technologies in Molecular and Cellular Biology | |
| 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 | |
| BIT 815 | Advanced Special Topics (Professional Development) | |
| 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) | |
| **Additional courses** | | **4** |
| 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** |

## Full Professor

Michele A. Battle

Liara M. Gonzalez

Robert M. Kelly

Yi Xiao

Jeffrey A. Yoder

## Associate Professors

Petra Bizikova

Glenn P. Cruse

Mary Elting

Rafael F. Guerrero Farias

Angela Harris

Bonnie L. Hurwitz

Manuel Kleiner

Laurianne Chantal Van Landeghem

Caroline Laplante

Wusheng Liu

Kelly Meiklejohn

Santosh Mishra

Brina Mortensen Montoya

Benjamin J. Reading

Michael Sano

Lauren V. Schnabel

## Assistant Professors

Christa Baker

Amay J. Bandodkar

Mallory Choudoir

Nathan Crook

Natalia Duque-Wilckens

Jessica Gluck

Sharonda Latrice Johnson LeBlanc

Zhe Lyu

Michael Rahe

Blake J. Rasor

Kasie Raymann

Maria L. Rodgers

Artem Rumyantsev

Breanna Jo Sheahan

Jack Wang

Xiaoqiu Wang

Justin Whitehill

Yang Zhang

## Teaching Associate Professors

Carlos C. Goller

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## Teaching Assistant Professors

Phillip E. Brown

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