

Molecular Biotechnology (Certificate)

Training in molecular biotechnology is essential for a wide range of disciplines from microbiology, plant and animal sciences to chemical engineering. The Graduate Certificate Program in Molecular Biotechnology offers an opportunity for individuals educated in the life sciences and related disciplines to gain laboratory-based, hands-on molecular biology training.

Certificate Degree Requirements

The Graduate Certificate Program in Molecular Biotechnology will require a minimum of 12 hours of required and elective courses. Coursework transferred from another institution is not applicable toward the certificate. Award of the certificate requires an overall GPA of 3.0 or better for certificate courses (required and elective) with a minimum grade of B- in any of the BIT courses and a minimum grade of C in coursework electives.

Other Relevant Information

NC State graduate students with career interests that involve molecular biotechnology, but are not eligible for the minor, are eligible to apply for the certificate.

Molecular Biotechnology Program Website (<https://biotech.ncsu.edu/minors-certificate/>)

Admission Requirements

1. Baccalaureate degree in a science or engineering discipline.
2. Minimum GPA of 2.75 in his/her/they undergraduate program, and a recommended minimum GPA of 3.0 in science courses.
3. All prerequisites (or their equivalent) to BIT 510 completed before beginning the certificate program. The minimum requirements for BIT 510 are: MB 251 or GN 311 (or equivalent) and two semesters of organic chemistry (equivalent to CH 221 and CH 223). Prerequisites for the coursework electives vary, and those prerequisites may be taken after admission to the certificate program if necessary.
4. Note that currently the Certificate is only available to students enrolled in a Masters Degree program at NC State.

Applicant Information

- **Delivery Method:** On-Campus
- **Entrance Exam:** None
- **Interview Required:** None

Application Information

Applications to the certificate program must be submitted at least one semester prior to the student's graduation deadlines

Plan Requirements

Code	Title	Hours
Core Courses		5
BIT 501	Ethical Issues in Biotechnology ¹	
BIT 510	Core Technologies in Molecular and Cellular Biology (+ Capstone Cloning Project) ²	
Elective Courses		7
BIT 5XX Laboratory Electives ³		
Other Electives ⁴		
Total Hours		12

- ¹ Students may take another approved research ethics/bioethics course determined in conjunction with the academic committee.
- ² Upon passing BIT 510 Core Technologies in Molecular and Cellular Biology with an 80% or higher, students must complete a Capstone Cloning Project (assignment in BIT 510).
- ³ Students may take any two BIT laboratory elective 2 credit courses. Courses vary by semester. For the most up to date list of BIT course offerings, visit the course catalog or the NC State Biotechnology website (<https://biotech.ncsu.edu/>).
- ⁴ Students may choose another 500-level or higher elective course outside "Other Elective Courses" listed below determined in conjunction with the academic committee.

Elective Courses

Code	Title	Hours
Select courses from the lists below:		
BIT Electives		
BIT 555	Cancer Drug Discovery and Development	2
BIT 564	Protein Purification	2
BIT 566	Animal Cell Culture Techniques	2
BIT 571	RNA Interference and Model Organisms	2
BIT 572	Proteomics	3
BIT 573	Protein Interactions	2
BIT 574	Plant Genetic Engineering	2
BIT 577	Metagenomics	2
BIT 579	High-Throughput Discovery	2
BIT 582	Virus Biotechnology: Pathogens to Therapeutics	2
BIT 580	Yeast Metabolic Engineering	2
BIT 588	Microbiome Analysis	3
BIT 595	Special Topics	1-6
BIT 815	Advanced Special Topics	1-6

Other Elective Courses

Code	Title	Hours
BCH 553	Biochemistry of Gene Expression	3
CHE 551	Biochemical Engineering	3
GN 721	Genetic Data Analysis	3
GN 701	Molecular Genetics	3
GN 735	Functional Genomics	3
MB 714	Microbial Metabolic Regulation	3
MB 725	Fermentation Microbiology	3
MB 758	Microbial Genetics & Genomics	3