

BIOTECHNOLOGY CERTIFICATE

The following requirements are in addition to, or further elaborate upon, those requirements outlined in The Graduate School Policy Guide (<https://catalogs.northwestern.edu/tgs/academic-policies-procedures/>).

Certificate

Total Units Required: 8

Course Requirements:

To earn a certificate in Biotechnology, students must meet the PhD requirements of their chosen department as well as complete the following core courses.

- **Biology Fundamentals:** two courses that provide broad coverage of fundamental biological principles, such as cell biology, biochemistry, molecular biology, systems biology, synthetic biology and quantitative biology. Trainees should select courses that build upon or complement their prior training—student having completed prior coursework in biological fundamentals (e.g., the equivalent of BIOL_SCI 315-0 Advanced Cell Biology or BIOL_SCI 390-0 Molecular Biology of Genome Editing and Engineering), should take graduate-level courses when possible, and students without this background may satisfy this requirement with advanced undergraduate coursework that provides exposure to biological fundamentals. To guarantee a solid quantitative foundation, all IBiS students are required to take IBIS 410-0 Quantitative Biology as one of the courses that satisfies this requirement.
- **Biotechnology Electives:** three elective courses (<https://www.biotechtraining.northwestern.edu/electives/>) (Please note that this list is not exhaustive). These courses may be drawn from the broad slate of courses offered across Northwestern. Electives may be selected to build additional knowledge in biological fundamentals, or they may focus on developing enabling technical skills. This requirement is intended to offer flexibility in order for trainees to develop technical strengths that align with their research goals and professional development.
- **Responsible Conduct of Research** (any one of the following):
IBIS 423-0 Ethics in Biological Research, GEN_ENG 519-0 Responsible Conduct for Research Training, CHEM 519-0 Responsible Conduct of Research Training or DGP 494-0 Colloquium on Integrity in Biomedical Research
- IBIS 421-0 Rigor & Reproducibility in Research: students should enroll in this course the summer after their first year of appointment to BTP.
- CHEM_ENG 478-0 Advances in Biotechnology

In order to petition to have a Graduate Certificate awarded and appear on the transcript, students must submit the Application for a Graduate Certificate ([#https://www.tgs.northwestern.edu/academic-policies-procedures/policies/certificate-requirements.html](https://www.tgs.northwestern.edu/academic-policies-procedures/policies/certificate-requirements.html)) once all Graduate Certificate requirements have been completed, but no later than the time that the student files for graduation (in the final quarter of study). Each submission should include a note indicating which courses were taken towards the Biology Fundamentals, Biotech Electives, and RCR requirements.