

CHEMICAL AND BIOLOGICAL ENGINEERING PHD

Degree Requirements

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/>).

PhD

Total Units Required: 10

Course	Title
Department Courses (6 units)	
Core chemical engineering topics (4 units):	
CHEM_ENG 421-0	Fluid Mechanics
CHEM_ENG 422-0	Heat and Mass Transfer
CHEM_ENG 408-0	Chemical Engineering Kinetics and Reactor Design
CHEM_ENG 404-0	Advanced Thermodynamics
Professional Development (0 units):	
CHEM_ENG 520-0 & CHEM_ENG 520-1	Professional Development in Chemical and Biological Engineering 1 and Professional Development in Chemical and Biological Engineering 2
Departmental electives (2 units)	
Additional Electives (4 units)	
Must be chosen from outside the department (2 units)	
May be chosen from within or outside the department (2 units)	

Other PhD Degree Requirements:

- **Departmental Seminar:** 4 quarters of attendance of the research seminar
- **Short course:** Responsible Conduct of Research
- **Teaching:** 4 quarters as a teaching assistant or a participant as a Teaching Apprentice
- **Examinations:** oral defense of dissertation research proposal during first nine quarters of residency
- **Research/Projects:** toward dissertation
- **PhD Dissertation:** based on independent, original research
- **Final Evaluations:** oral defense of dissertation