

MOLECULAR BIOPHYSICS MINOR

MINOR DESCRIPTION

Molecular biophysics is an interdisciplinary area of research situated at the intersection of molecular biology, chemistry, chemical biology, physical chemistry, and molecular physics. Molecular biophysics, as a field of endeavor, is distinguished by analytical and quantitative research inquiry of biomolecular and macromolecular systems, using diverse molecular spectroscopic methods, structure determination, functional bioenergetics, statistical thermodynamics, and molecular dynamics. Topics of active research interest at Wesleyan include protein structure and folding, molecular models of enzyme mechanisms, protein-DNA and protein-RNA interactions, biofilm formation, molecular pores and other membrane proteins. As a consequence of recent advances stemming from the human genome project, the field of structural bioinformatics finds an increasingly important emphasis in our program. A parent organization for this field of research is the U.S.-based Biophysical Society, with some 7,000 members, and sister societies worldwide.

ADMISSION TO THE MINOR

As Molecular Biophysics is an interdisciplinary minor, it is strongly recommended that undergraduate students gain foundational knowledge by majoring in one of these three areas: Molecular Biology and Biochemistry, Chemistry, or Physics.

MINOR REQUIREMENTS

The Molecular Biophysics Minor requires a total of seven credits:

| Code | Title | Hours |
|-------------------------------------|---|-------|
| Introductory Course | | |
| PHYS207 | Introduction to Biophysics (Introductory Course) | 1 |
| or CHEM309 | Molecular and Cellular Biophysics | |
| or CHEM325 | Introduction to Biomolecular Structure | |
| Advanced Laboratory Course | | |
| MB&B/CHEM395 | Structural Biology Laboratory | 1 |
| Journal Club | | |
| MB&B307 & MB&B308 | Molecular Biophysics Journal Club I and Molecular Biophysics Journal Club II | 1 |
| Independent Research | | |
| CHEM423 & CHEM424 | Advanced Research Seminar, Undergraduate and Advanced Research Seminar, Undergraduate | 1 |
| or MB&B423 & MB&B424 | Advanced Research Seminar, Undergraduate and Advanced Research Seminar, Undergraduate | |
| or PHYS423 & PHYS424 | Advanced Research Seminar, Undergraduate and Advanced Research Seminar, Undergraduate | |
| Physical Chemistry Course(s) | | |
| MB&B381 | Physical Chemistry for the Life Sciences | 1,2 |

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|----------------------|---|
| or CHEM337 & CHEM338 | Physical Chemistry I: Quantum Mechanics and Spectroscopy and Physical Chemistry II: Thermodynamics, Statistical Mechanics, and Kinetics |
| or PHYS316 & PHYS213 | Thermal and Statistical Physics and Waves and Oscillations |

Advanced Elective Course(s)

Select one or two elective courses from the list below. 1,2

Advanced Elective courses can be chosen from: BIOL265, BIOL266, BIOL310, BIOL322, CHEM321, CHEM342, CHEM382, CHEM383, CHEM386, CHEM387, CHEM396, MB&B237, MB&B340, MB&B516, MB&B520, MB&B523, MB&B535, PHYS214, and PHYS524.

Independent research must be conducted with or in collaboration with a Molecular Biophysics faculty member (<https://www.wesleyan.edu/molbiophys/people/>). Senior thesis research may be used to complete this requirement.

ADDITIONAL INFORMATION

At Wesleyan, students participating in the molecular biophysics program have the opportunity to select research projects with varying degrees of emphasis on biophysics, biochemistry, biological chemistry, bioinformatics, and/or molecular biology. The common element among participants is an emphasis on a quantitative, molecular-based mode of inquiry in research.

All Molecular Biophysics minors complete independent research projects with affiliated faculty and participate regularly in weekly meetings of the Molecular Biophysics Journal Club (MB&B507 and MB&B508), in which research papers from the current literature are presented and discussed. Journal club students also meet regularly with seminar visitors in the area of molecular biophysics. The program hosts an annual retreat where undergraduate and graduate students are expected to present their research either orally or in poster format. (<https://www.wesleyan.edu/molbiophys/activities/retreat.html>) Students are also encouraged to present their work at an international scientific meeting, and the program typically provides some financial support for their expenses.