MOLECULAR AND CELLULAR BIOPHYSICS CERTIFICATE

We provide our trainees with a rigorous grounding in the basic principles of molecular and thermodynamic descriptions of macromolecules through the 650 series (https://biophysics.unc.edu/training-3/core-biophysics-modules/) of three intense, 1-credit modules taken by all trainees. Beyond that, trainees choose from modules that teach the fundamentals of different methods for investigating the structure and function of macromolecules. These allow trainees to establish a solid theoretical and practical (some have both lab and lecture components) background in the particular areas of biophysics relevant to their individual training goals.

Research rotations performed during the first year of training provides trainees opportunities both to obtain additional practical experience and to identify potential laboratories for their thesis research.

Trainees have the opportunity to present a poster at the Carolina Biophysics Symposium (https://cbs.web.unc.edu/). A central goal of the symposium is to bring together North Carolina Biophysicists and the meeting is organized and sponsored by North Carolina colleges.

Finally, our training program prepares trainees to be successful in the highly collaborative atmosphere of modern bioscience. All our courses are organized into work groups in which trainees do assignments in a collaborative fashion. This encourages trainees from diverse basic disciplines (cell biology to physics) to work together and learn from each other as well as attack problems in an interdisciplinary fashion. Our seminar course not only introduces trainees to research that spans the broad range of modern biophysics, but also helps them develop the oral communication skills critical to their professional success.

Course Requirements

Code	Title	Hours
Core Courses		
BIOC 650	Macromolecular Thermodynamics and Binding	1
BIOC 651	Macromolecular Interactions and Forces	1
BIOC 652	Macromolecular Dynamics	1
BIOC 662	Macromolecular Interactions [1]	1
or BIOC 670	Structural Bioinformatics	
BIOC 704	Seminars in Biophysics	2
Scientific Communication Requirement		2
BIOC 710	Scientific Communication [2]	
BIOC 716	Biophysics Colloquium [3]	2
BBSP 705	Best Practices for Rigor and Reproducibility in Research	1
BCB 888	Responsible Conduct of Research [4]	1
or BIOC 888	Responsible Conduct of Research	
Three Additional Biophysics Method Modules		
BIOC 662	Macromolecular Interactions	
BIOC 663A	Macromolecular NMR	
BIOC 663B	Macromolecular NMR Practice	
BIOC 664	Macromolecular Spectroscopy	
BIOC 665	Advanced NMR Spectroscopy Course	
BIOC 666	X Ray Crystallography of Macromolecules	
BIOC 667	Macromolecular Crystallographic Methods	
BIOC 669	Macromolecular Crystallographic Methods II	
BIOC 670	Structural Bioinformatics	
BIOC 673	Proteomics, Protein Identification and Characterization by Mass Spectrometry	
BIOC 675	Fundamentals of Cryo-Electron Microscopy	
BCB 715	Mathematical and Computational Approaches to Modeling Signaling and Regulatory Pathways	
BCB 750	MOLECULAR DYNAMICS	
PHCO 750	Proteomics Methods and Applications	
BMME 890	Special Topics	
Minimum Hours		**15**

1. Not required for students matriculating before Fall 2023.
2. Or similar grant writing class from another department.
3. BIOC 716 is a 0.5 credit course, which can be repeated four times for a total of 2 credits. Not required for students matriculating before Fall 2023. Students must enroll during their 2nd and 3rd year—for a total of 4 semesters.
4. Responsible conduct of research (1 credit): This is for senior graduate students, generally 4th year in the Spring.

Non-Course Certificate Requirement