The course will explore the principles and practical applications of biophysical methods in contemporary research, with an emphasis on understanding macromolecular structure and function. A broad range of techniques including various forms of spectroscopy and microscopy will be covered. Students will learn practical aspects of design and conduct of experiments and review scientific literature demonstrating the value of these methods.

IBIS 416-0 Practical Training in Chemical Biology Methods and Experimental Design (1 Unit)
Experimental design, data analysis, mass spectrometry; proteomics, in vivo and molecular imaging, small molecule synthesis and purification; high-throughput screening, x-ray crystallography, analysis of bioelements.

IBIS 421-0 Rigor & Reproducibility in Research (0 Unit)
Experimental design and data analysis will be discussed through analysis of case studies on the topics of rigorous statistical analysis, transparency in reporting, data and material verification and sharing.

IBIS 423-0 Ethics in Biological Research (0 Unit)
The focus of this course will be on education in the responsible conduct of research (RCR). Topics discussed include: conflict of interest, the use of animals and human subjects in research, mentoring and lab management, collaborative research, data ownership and management, peer review, authorship, misconduct and the processes for handling misconduct.

IBIS 432-0 Statistics for Life Sciences (1 Unit)
Statistics course with emphasis on the application of statistical methods and data analysis techniques to the life sciences. Topics include descriptive statistics, normal distribution, random variables, sampling distribution, confidence intervals, hypothesis tests, p-values and multiple correction, linear regression, model selection, diagnostics, logistic regression, contingency tables, resampling, clustering, dimension reduction, and genomics data analysis.

IBIS 455-0 Special Topics (1 Unit)
Offered regularly for small groups of graduate students. The teaching faculty and topics change each quarter.

IBIS 462-0 Seminar in Biological Sciences (0 Unit)
IBIS 491-0 Development and Evolution of Body Plans (1 Unit)
Molecular mechanisms underlying early embryonic development, including establishment of the body and organogenesis. Discussion of original literature.

IBIS 499-0 Independent Study (1 Unit)
IBIS 519-0 Responsible Conduct of Research Training (0 Unit)
This course is a review of concepts introduced in IBIS 423-0. Prerequisite: IBIS 423-0 or equivalent.

IBIS 590-0 Research (1-3 Units)