The HHMI SEA-PHAGES project offers a year-long research-based laboratory course for undergraduates with little or no background in college-level biology.

**Course Structure**
The course is intended for first-year students, spans two terms, and culminates in a research symposium.

- **First term**: Students isolate phages from environmental samples they collect. Once isolated, students characterize their phage using a variety of techniques, including electron microscopy and DNA restriction analyses. Collectively, students then select 1 or 2 phages for which the genomes will be sequenced.
- **Second term**: Students annotated and analyze the genomes through bioinformatics.
- **Research Symposium**: A select number of students from each participating institution will be invited to share and discuss their data at the annual SEA-PHAGES symposium.

**Course Objectives**
The course is designed to provide students with an authentic research experience, where students gain a sense of ownership of the scientific problem and of the discoveries made. In particular, the course provides:

*an Opportunity for Critical Thinking*

- Data analysis and interpretation
- Experimental design
- Reading and analysis of primary literature
- Understanding applications of mathematical modeling in problem solving

*an Introduction to Scientific Skills*

- Aseptic technique
- Microbiology
- Molecular biology
- Electron microscopy
- DNA sequencing
- Comparative genomic analysis
- Functional genomic analysis
- Genome annotation

*an Opportunity for Professional Development*

- Effective presentation of research
- Networking with other SEA participants
- Dissemination of research findings including co-authorship on peer-reviewed publications and submissions to genomic databases