

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

A new course and textbook on Physical Models of Living Systems, for science and engineering undergraduates¹ PHILIP NELSON, Univ Pennsylvania — I'll describe an intermediate-level course on “Physical Models of Living Systems.” The only prerequisite is first-year university physics and calculus. The course is a response to rapidly growing interest among undergraduates in a broad range of science and engineering majors. Students acquire several research skills that are often not addressed in traditional courses:

- Basic modeling skills
- Probabilistic modeling skills
- Data analysis methods
- Computer programming using a general-purpose platform like MATLAB or Python
- Dynamical systems, particularly feedback control.

These basic skills, which are relevant to nearly any field of science or engineering, are presented in the context of case studies from living systems, including:

- Virus dynamics
- Bacterial genetics and evolution of drug resistance
- Statistical inference
- Superresolution microscopy
- Synthetic biology
- Naturally evolved cellular circuits.

¹Work supported by NSF grants EF-0928048 and DMR-0832802.

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Date submitted: 07 Nov 2014

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