

Basic Biophysics for Motion in Cells

PHYS 798N CHPH 718N

Instructor: **Michael E. Fisher**, Room 2100A, IPST Bldg. 85,
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Time: **Tuesdays and Thursdays, 9:30 am to 11:00 am**

Place: Department of Physics: Room 4208

Home page: [Course Outline](#), [Book Contents](#), [Appendix](#)

Home page: <http://www.physics.umd.edu/courses/Phys798N/index.html>

Credit: 3 hours

Aims and Content: The aim of the course is to give graduate students in the physical, chemical, engineering and biochemical sciences an introduction to some aspects of modern molecular biophysics, which draws on concepts and ideas from physics, chemistry, engineering and, of course, biology. To this end the **book by Jonathon Howard** (see below) will be used as the **required course text** although not all the topics treated in the book will be covered. (The *Contents* of Howard's book may be viewed on the home page for the course.) Some appreciation for modern research on Amolecular motors@ or motor proteins, which is being pursued at the *single-molecule level*, is an overall goal. The final assignment will include a report on a paper from the recent and current literature.

Prerequisites: The course will be taught at an introductory graduate level, developing needed concepts and assuming only some acquaintance with undergraduate mechanics, thermodynamics, statistical mechanics, and calculus. *No prior knowledge* of biology will be presupposed. Well prepared and motivated undergraduates may be admitted with the instructor's approval.

- Texts: (a) **Mechanics of Motor Proteins and the Cytoskeleton** by **Jonathon Howard** (Sinauer Associates, Inc., Sunderland, Mass., 2001). [**required**]
(b) **Cell Movements: From molecules to motility** by **Dennis Bray**, 2nd Edn., (Garland Publishing, 2001).
Notice the significant advanced undergraduate text: -
(c) **Biological Physics: Energy, Information, Life** by **Philip Nelson** (University of Pennsylvania) (W.H. Freeman & Co., New York, 2004).
(d) **Physical Biology of the Cell** by **Rob Phillips, Jane Kondev, and Julie Theriot** (Garland Science, Hamden, CT, 2008).

Also *ON RESERVE* (along with the other books mentioned) for background in cell biology the recommended (but not required) text is: -

- (e) **Essential Cell Biology** by **Bruce Alberts and coauthors** (Garland Publishing, Inc., New York, 1997); but see **also** (bigger and heavier):
(f) **Molecular Cell Biology** by **H. Lodish and coauthors**, 3rd Edn. (W.H. Freeman & Co., New York, 1995),
(g) **Molecular Biology of the Cell** by **B. Alberts and coauthors**, 3rd or later Edn. (Garland Publishing, Inc., New York, 1994),
(h) **The Cell: A Molecular Approach** by **G.M. Cooper**, 2nd Edn. (Sinauer Associates, Inc., Sunderland, Mass., 2000).
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