Intermediate Physics for Medicine and Biology

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Intended for advanced undergraduate and beginning graduate students in biophysics, physiology, medical physics, cell biology, and biomedical engineering, this wide-ranging text bridges the gap between introductory physics and its application to the life and biomedical sciences. This extensively revised and updated fourth edition reflects new developments at the burgeoning interface between physics and biomedicine. Among the many topics treated are: forces in the skeletal system; fluid flow, with examples from the circulatory system; the logistic equation; scaling; transport of neutral particles by diffusion and by solvent drag; membranes and osmosis; equipartition of energy in statistical mechanics; the chemical potential and free energy; biological magnetic fields; membranes and gated channels in membranes; linear and nonlinear feedback systems; nonlinear phenomena, including biological clocks and chaotic behavior; signal analysis, noise and stochastic resonance detection of weak signals; image formation and description; image reconstruction; hearing and medical ultrasound; atoms and light; near infrared scattering; optical coherence tomography; infrared radiation; ultraviolet light; radiometry and photometry; the interaction of photons and charged particles in tissue; radiological physics and the use of x-rays in diagnosis and therapy; nuclear medicine; and magnetic resonance imaging. Discussion of theory is now more closely linked to experiment, and stochastic processes are presented as an integral part of biological systems. A prior course in physics and in calculus is assumed.

Over 800 problems (a 44% increase from the third edition) are included to test the student's understanding and to provide additional biological examples. A solutions manual is available to instructors. Each chapter has an extensive list of references for further reading. *Intermediate Physics for Medicine and Biology* is also ideal for self study and as a reference for workers in medical and biological research.

KEY FEATURES:

- Provides an excellent background in physics for physicians, biomedical engineers, and biologists
- Includes a new chapter on sound and ultrasound and presents stochastic processes as an integral part of biological systems
- Emphasizes applications of physics to biomedicine rather than molecular biophysics
- Contains numerous problems and exercises for course use and to test understanding for self study

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