



Phys 2002	MODERN PHYSICS	(CR3)
Preq.	Phys 1101, 1102, 1201	

Objectives

Modern Physics is a one-semester course covering major concepts of twentieth-century physics..

Syllabus

Special theory of relativity, space and time, Lorentz transformation, time dilation, length contraction, twin paradox, relativistic momentum, mass-energy relation, energy momentum relation. Nuclear atom, electron orbits, atomic spectra, Bohr atom, energy levels and spectra, nuclear motion, atomic excitations, lasers, many electron atoms, electron spin, exclusion principle, atomic structure, spin orbit coupling, molecular physics, molecular bond, electron sharing, hydrogen molecule, complex molecules, statistical distributions, Maxwell-Boltzmann statistics, quantum statistics, Releigh-Jeans formula, Planck's radiation law, specific heat of solids, free electrons in metals, nuclear structure, nuclear properties, binding energy, stable nuclei, radioactive decay, alpha decay, beta decay, gamma decay, nuclear reactions, nuclear fission, nuclear reactor, Electrons in solids, free electron gas, band theory of solids, semiconductors and insulators, semiconductor devices, superconductivity.

Recommended Books

1. *Concepts of Modern Physics*, A. Beiser, McGraw Hill, (6th edition), (2002)
2. *Physics (Volume 1 & 2)* by R. Resnick, D. Halliday and K. S. Krane (5th Edition), Wiley (2002)
3. *University Physics with Modern Physics* by H. D. Young, R. A. Freedman (14th Edition), Addison-Wesley (2015).
4. *Quantum Physics* by E. H. Wichmann, Berkeley Physics Course Volume 4, Berkeley (1965)
5. *Physics for Scientists and Engineers* by R. A. Serway and J. W. Jewett (8th Edition), Golden Sunburst Series (2010)
6. *Physics for Scientists and Engineers with Modern Physics* by D. C. Giancoli (4th Edition), Addison-Wesley (2008).