

# Physics 0790- “Physics of Matter”

## Syllabus (subject to revisions)

- **Week I (9/9 - 9/11)**

Lecture 1 - Introduction, Course Overview, Blackbody Radiation

Assigned Reading for this Week - Ch 3: Sec. 2

Homework - No homework due this week

- **Week II (9/14 - 9/18)**

Lecture 1 - Photoelectric Effect, Wavelike Properties of Particle I

Lecture 2 - Wavelike Properties of Particle II : Phase and Group Velocity, de Broglie Waves

Assigned Reading for this Week - Ch 3: Sec. 3; Ch 5

Homework - No homework due this week

- **Week III (9/21 - 9/25)**

Lecture 1 - Matter Waves of Electrons,

Lecture 2 - Neutrons and Atoms, Propability Interpretations, and Uncertainty Relation

Assigned Reading for this Week - TBA

Homework - Assignment 1 due

- **Week IV (9/28 - 9/2)**

Lecture 1 - Atomic Structure and Spectral Lines, Rutherford Experiment

Lecture 2 - Spectral Lines of Hydrogen, Bohr Model

Assigned Reading for this Week - TBA

Homework - Assignment 2 due

- **Week V (10/05 - 10/09)**

Lecture 1 - Correspondence Principle, Frank-Hertz Experiment

Lecture 2 - Quantum Mechanics: Wave Function & Review

Assigned Reading for this Week - TBA

Homework - Assignment 3 due

- **Week VI (10/12 - 10/16)**

Lecture 1 - Schrödinger Equation, Operators, Eigenfunctions, Eigenvalues

Lecture 2 - Particle in a Box, Uncertainty Relations

Assigned Reading for this Week - TBA

Homework - Assignment 4 due

- **Week VII (10/19 - 10/23)**

Lecture 1 - Exam - Mid-term 1

Lecture 2 - Harmonic Oscillator

Assigned Reading for this Week - Notes on the WebCT

Homework - Assignment 5 due

- **Week VIII (10/26 - 10/30)**

Lecture 1 - Tunnel Effect, STM

Lecture 2 - Quantum States of The Hydrogen Atom: Schrödinger Equation for Central Potentials

Assigned Reading for this Week - Notes on the WebCT

Homework - Assignment 6 due

- **Week IX (11/02 - 11/06)**

Lecture 1 - Angular Momentum, Electron Probability Density

Lecture 2 - Zeeman Effect, Stern-Gerlach Experiment

Assigned Reading for this Week - Notes on the WebCT

Homework - Assignment 7 due

- **Week X (11/09 - 11/13)**

Lecture 1 - Spin of the Electron, Spin-Orbit Coupling

Lecture 2 - NMR, MRI, Lasers

Assigned Reading for this Week - TBA

Homework - Assignment 8 due

- **Week XI (11/16 - 11/20)**

Lecture 1 - Review

Lecture 2 - Exam - Mid-term 2

Assigned Reading for this Week - TBA

Homework - Assignment 9 due

- **Week XII (11/23 - 11/27)**

Lecture 1 - Many Particles: Complex Atoms, Independent Particles, Identical Particles

Lecture 2 - Thanksgiving Break

Assigned Reading for this Week - TBA

Homework - Assignment 10 due

- **Week XIII (11/30 - 12/04)**

Lecture 1 - Pauli Exclusion Principle, Symmetric and Antisymmetric Wave Functions, Periodic Table of Elements

Lecture 2 - Solid State Physics: Chemical Bonds, Energy band structure

Assigned Reading for this Week - TBA

Homework - Assignment 10 due

- **Week IXV (12/07 - 12/11)**

Lecture 1 - Semiconductors, insulators, and metals; Optical and Electrical Properties; Superconducting Properties

Lecture 2 - Reading Period - Review

Assigned Reading for this Week - TBA

Homework - Assignment 11 due

- **12/21**

FINAL EXAM - 2:00 pm (All Material)