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Fall 9-1-2000

PHYS 341.01: Fundamentals of Modern Physics

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FUNDAMENTALS OF MODERN PHYSICS

- LECTURES: MWF 1:10-2:00, Science Complex 231
- INSTRUCTOR: Dr. Carla Riedel
Office: SC 122 / 243-5179 / riedel@selway.umt.edu
Office hours: M 11:10, T 3:10, W 2:10, R 9:10, F 10:10,
and by appointment
- DESCRIPTION: Includes historical background for development of modern physics, and an introduction to special relativity, quantum mechanics, atomic physics, and subatomic physics.
- PREREQUISITES: One year of general physics (preferably Phys 221/222);
One year of differential and integral calculus (Math 152/153).
- TEXT: *A Traveler's Guide to Spacetime*, Moore (McGraw-Hill 1995) and
Modern Physics, 2nd ed., Krane (Wiley 1996).
- ONLINE: Class website: <http://www.physics.umt.edu/phys341>
- HOMEWORK: Plan to spend at least 6 hours on homework each week.
Homework will be assigned one to three times a week.
Working with others on homework is encouraged, but
the work you turn in must be your own.
Due at beginning of class on due date.
20% per day late-homework fee.
- EXAMS: Closed book.
Simple calculator (without symbolic manipulation) required.
Three in-class midterms (one 3"×5" note card allowed).
One two-hour, comprehensive final (one 8.5"×11" sheet allowed).
Help sessions will be scheduled prior to each exam.
Make-up exams allowed only in extreme situations, and
only when arranged in advance.
- GRADING: Midterms 40%
Homework 35%
Final Exam 25%
All grading will be based on correctness, completeness, and clarity.

Students with disabilities requiring accommodations, please, see the instructor.

TENTATIVE SCHEDULE

| Week | Chapter | Topic | Exam |
|------------------|----------------|---|--------|
| 9/5 – 9/8 | M1 | Introduction The Principle of Relativity | |
| 9/11 – 9/15 | M2,M3 M4 | Synchronization, Spacetime, Nature of Time, Metric Equation | |
| 9/18 – 9/22 | M6,M7 M5,M8 | Coordinate Transformations, Contractions Proper time, Velocity Transformations | |
| 9/25 – 9/29 | M9,M10 K14 | Four-Momentum Elementary Particles | |
| 10/2 – 10/6 | K14 | | F 10/6 |
| 10/9 – 10/13 | K3 K4 | Photons as Particles Particles as Waves | |
| 10/16 – 10/20 | K4 K5 | The Schrödinger Equation | |
| 10/23 – 10/27 | K5 K5 | | |
| 10/30 – 11/3 | K5 | | F 11/3 |
| 11/6, 11/8 | K6 K6 | The Rutherford-Bohr Atom | |
| 11/13 – 11/17 | K6 K7 | The Hydrogen Atom | |
| 11/20 – 11/21 | K7 | | |
| 11/27 – 12/1 | K8 K8 | Many-Electron Atoms | |
| 12/4 – 12/8 | K8 K12 | Nuclear Physics | F 12/8 |
| 12/11 – 12/15 | K12 | Review | |
| 12/21 | | 1:10–3:10 | FINAL |

M = Moore; K = Krane

Subject coverage may vary, but exam dates are firm.

Reminder: September 25 is No Penalty Drop Deadline.