

## Modern Physics      Physics 2305   Fall 2017

Text Book:    Modern Physics  
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                  Room 108,   Phone 341-4792  
Office Hours  4:00-5:00 Monday, 10:00-12:00 Tuesday

### Grading

Homework    40%  
Midterms (2) 20% each    September 27, November 1  
Final            20%                    Tuesday, December 12, 12:30 pm

### Homework is due Wednesday at the start of class

One homework score will be dropped at end of the course

**Use of files from previous semesters is not allowed, and will be severely penalized!**

### Fundamental Concepts and Applications

#### Special Relativity

A new idea of time and space  
The twin paradox

#### Quantized Light (Photons)

Black body radiation  
Photo-electric effect  
Compton scattering

#### Matter Waves

Probability  
Uncertainty  
Quantized energy

#### Atomic spectra

Failure of classical physics  
Energy levels  
Photo-emission and absorption

#### Quantum Mechanics

Operators  
Schrodinger's Equation  
Eigen States  
Superposition  
Time evolution

#### Hydrogen Atom

Full quantum treatment  
Electron spin

#### Multi-electron atoms

Pauli exclusion principle  
Shell structure  
Magnetic fields

#### Statistical Mechanics

Classical many body physics  
Quantum statistics  
Heat capacity

#### Molecules

Bonds  
Rotation  
Vibration  
Raman scattering

#### Solids

Crystal structure  
Band structure  
Conduction  
Semi-conductors

#### Nuclear Physics

Structure  
Bonding  
Binding energies  
Decay  
Fusion

#### Elementary Particles

Fundamental forces  
Quarks, Leptons  
Antiparticles  
Quantum fields