# Introductory Physics III – Thermal and Modern Physics

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## August 2023

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## Lecture 01: Introduction

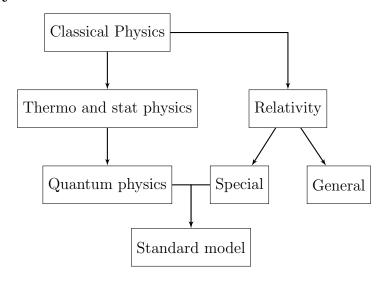
Fri 04 Aug '23

# 1 The Course

#### 1.1 Schedule

- MWF 12:00-13:00 lecture hours (no tutorial on Monday)
- Tutorials will still be held occasionally with homework discussions and quizzes.

#### 1.2 Syllabus



# 1.3 Grading

• Quizzes: 20%.

• Midterm: 40%.

• Final: 40%.

# 2 Classical Physics

#### 2.1 Newton's Laws

(I) In an inertial frame,  $\mathbf{F}_{\text{net}} = 0 \implies \mathbf{v} = \text{const.}$ 

(II)  $\ddot{r} = \frac{F_{\text{net}}}{m}$  where m is the inertial mass.

(III) For any 2 particles,  $\mathbf{F}_{12} = -\mathbf{F}_{21}$ .

#### 2.1.1 Math: Vector Equations

$$\ddot{\boldsymbol{r}} = \frac{\boldsymbol{F}}{m} \equiv \begin{cases} \ddot{x} = \frac{F_x}{m} \\ \ddot{y} = \frac{F_y}{m} \\ \ddot{z} = \frac{F_z}{m} \end{cases}$$

For a system of N particles, we have 3N equations of motion. With 6N initial conditions, the evolution of the system is uniquely determined.

- 2.2 Conservation Laws
- 2.2.1 Momentum
- 2.2.2 Energy
- 2.2.3 Angular Momentum