



## CU Modern Physics Curriculum

Indicates a research-demonstrated benefit

### Overview

Curriculum for large-lecture modern physics class for engineering majors. Focus on reasoning development, model building, and real-world applications.



#### Type of Method

Full curriculum, Curriculum supplement, Tutorials, Computer simulations



#### Level

**Designed for:** Intermediate

**Can be adapted for:** Teacher Prep Course, Teacher Professional Development, High School, Intro College Calculus-based, Intro College Algebra-based, Intro College Conceptual, Upper-level Undergraduate, Graduate School



#### Setting

**Designed for:** Lecture - Large (30+ students) , Homework

**Can be adapted for:** Lecture - Small (<30 students), Recitation/Discussion Session, Lab, Studio



#### Coverage

Many topics with less depth



#### Topics

Modern / Quantum



#### Instructor Effort

Medium



#### Resource Needs

Projector, Computers for students



#### Skills

**Designed for:** Conceptual understanding , Making real-world connections

, Problem-solving skills, Using multiple representations

**Can be adapted for:** Lab skills, Metacognition



#### Research Validation

**Based on research into:** theories of how students learn , student ideas about specific topics

**Demonstrated to improve:** conceptual understanding , beliefs and attitudes

**Studied using:** student interviews , classroom observations , analysis of written work , peer-reviewed publication



### Compatible Methods

[Peer Instruction](#), [PhET](#), [JiTT](#), [CGPS](#), [Physlets](#), [SCALE-UP](#), [OSP](#), [Thinking Problems](#), [LA Program](#), [CAE TPS](#), [New Model Course](#), [CPU](#), [TEFA](#), [CU QM](#), [QuILTs](#), [Paradigms](#), [PI QM](#), [Tutorials](#), [Clickers](#)



### Similar Methods

[New Model Course](#), [CU E&M](#), [CU QM](#)



### Developer(s)

Carl Wieman, Kathy Perkins, Sam McKagan



### Website

<http://per.colorado.edu/modern>



### Intro Article

5247



### Intro Article

[Reforming a large lecture modern physics course for engineering majors using a PER-based design](#)

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## **Teaching materials**

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You can download all course materials, including lecture slides, clicker questions, homework, exams, and solutions from the developer's website (you'll need to ask for a password to access solutions): <http://per.colorado.edu/modern>