



## CU upper-division E&M curriculum

Indicates a research-demonstrated benefit

### Overview

Supplementary activities for upper-level E&M. All materials are modular and can be mixed and matched with any other teaching strategy or materials.



**Type of Method**

Full curriculum, Curriculum supplement, Tutorials



**Level**

**Designed for:** Upper-level Undergraduate

**Can be adapted for:** Intermediate, Graduate School



**Setting**

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

, Recitation/Discussion Session, Homework

**Can be adapted for:** Out-of-class tutorials



**Coverage**

Many topics with less depth, Traditional upper-division E&M I coverage (e.g. first half of Griffiths text)



**Topics**

Electricity / Magnetism



**Instructor Effort**

Medium



**Resource Needs**

TAs / LAs, Clickers / polling method, Projector



**Skills**

**Designed for:** Conceptual understanding , Problem-solving skills , Using multiple representations, Identifying appropriate method to solve particular problems, Faculty attention to student difficulties.

**Can be adapted for:** Making real-world connections, Metacognition



**Research Validation**

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

**Demonstrated to improve:** conceptual understanding

**Studied using:** student interviews , classroom observations , research at multiple institutions



**Compatible Methods**

[Peer Instruction](#), [PhET](#), [JiTT](#), [CGPS](#), [Physlets](#), [SCALE-UP](#), [OSP](#), [LA Program](#), [CAE TPS](#), [TEFA](#), [Paradigms](#), [Tutorials](#), [Clickers](#)

 **Similar  
Methods**

[CU Modern](#), [CU QM](#), [Paradigms](#)

 **Developer(s)**

Steven Pollock, Stephanie Chasteen, and many others in the CU PER group and the CU Physics department

 **Website**

[http://www.colorado.edu/sei/departments/physics\\_3310.htm](http://www.colorado.edu/sei/departments/physics_3310.htm)

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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):

E&M I: [http://www.colorado.edu/sei/departments/physics\\_3310.htm](http://www.colorado.edu/sei/departments/physics_3310.htm)

E&M II: [http://www.colorado.edu/sei/departments/physics\\_3320.htm](http://www.colorado.edu/sei/departments/physics_3320.htm)