



## SAMPLE SYLLABUS #2

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# AP<sup>®</sup> Physics C: Electricity and Magnetism

## Curricular Requirements

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<b>CR1</b>	Students and teachers have access to college-level resources, including a college-level textbook and reference materials in print or electronic format.	<i>See page:</i> 2
<b>CR2</b>	The course provides opportunities to develop student understanding of the required content outlined in each of the units described in the AP Physics C: Electricity and Magnetism Course and Exam Description.	<i>See page:</i> 2
<b>CR3</b>	The course provides opportunities for students to develop the skills related to Science Practice 1: Creating Representations.	<i>See page:</i> 2
<b>CR4</b>	The course provides opportunities for students to develop the skills related to Science Practice 2: Mathematical Routines.	<i>See page:</i> 2
<b>CR5</b>	The course provides opportunities for students to develop the skills related to Science Practice 3: Scientific Questioning & Argumentation.	<i>See page:</i> 2
<b>CR6</b>	Students spend a minimum of 25% of instructional time engaged in hands-on laboratory investigations.	<i>See page:</i> 3
<b>CR7</b>	Students engage in hands-on laboratory investigations representative of the topics outlined in the AP Physics C: Electricity and Magnetism Course and Exam Description.	<i>See page:</i> 3
<b>CR8</b>	The course provides opportunities for students to record evidence of their scientific investigations in a portfolio of lab reports or a lab notebook (print or digital format).	<i>See page:</i> 3

# Advanced Placement Physics C: Electricity and Magnetism Sample Syllabus #2

Textbook provided on the AP Course Audit form. **CR1**

## Course Content

The course will consist of these units listed in the AP<sup>®</sup> Physics C: Electricity & Magnetism Course and Exam Description: **CR2**

Unit 8: Electric Charges, Fields, and Gauss's Law

Unit 9: Electric Potential

Unit 10: Conductors and Capacitors

Unit 11: Electric Circuits

Unit 12: Magnetic Fields and Electromagnetism

Unit 13: Electromagnetic Induction

### **CR2**

The syllabus must include an outline of course content by unit title to demonstrate the inclusion of the required course content listed in the current AP Physics C: Electricity and Magnetism Course and Exam Description.

## Science Practices Alignment

Science Practice 1: Creating Representations

### **CR3**

Students will sketch graphs and collect data in tables as they monitor and create an RC circuit

Science Practice 2: Mathematical Routines

### **CR4**

Students will compare a physical quantity (a magnetic field) across the areas around a current-carrying coil spring and draw conclusions about where it is the strongest

Science Practice 3: Scientific Questioning and Argument **CR5**

Students must be able to support claims about the important properties that affect a magnetic field during the electromagnet experiment

### **CR3**

The syllabus must include a section labeled “Science Practice 1” describing one assignment, activity, or lab where students create representations that depict physical phenomena.

### **CR4**

The syllabus must include a section labeled “Science Practice 2” describing one assignment, activity, or lab where students use mathematical routines.

### **CR5**

The syllabus must include a section labeled “Science Practice 3” describing one assignment, activity, or lab where students design experimental procedures, and make and justify claims.

## Lab Collection Requirement

Students are provided with their laboratory experiment after completion and grading. Those students who complete them electronically are encouraged to collect them as a folder that acts as a lab notebook. Students who complete the experiments by hand are provided with a physical folder that can be used to create a lab notebook. **CR8**

## Laboratory Work

Students are engaged in laboratory work at least 25% of the class time. **CR6** The labs are listed and described below: **CR7**

- Sticky Tape Lab: Students are expected to identify and describe behavior of various charged and neutral objects using electrostatic concepts, based on their own actions
- Electroscope Lab: Students are expected to accurately describe the methods for charging and discharging electroscopes using principles of electric charge
- Ohm's Law Lab: Students find the relationship between voltage and current for two different light bulbs, describe changes in the relationship as voltage increases, and explore internal resistance of a power source
- Series and Parallel Circuits Lab: Students design an experiment to find the changes in voltage and current for resistors in series and resistors in parallel
- Kirchhoff's Rules Lab: Students are provided with a complex electric circuit using resistors and batteries, make a prediction of how voltage and current might be distributed within it, then find values that either support or refute their ideas about those values
- R-C Circuit Lab: Students set up an RC circuit, predict the shapes of voltage-time and current-time graphs, check their predictions, and determine which factors influence the time needed for the capacitor to charge
- Electromagnet Lab: Students determine the effect of a magnet on a compass and wire, as well as how factors like electric current, number of wraps, and number of nails affect the strength of an electromagnet
- e/m Lab: Students derive an expression for the radius of a charge's curvature due to a magnetic field; they also use data relating coil current and magnetic field to create an algebraic representation of their relationship, then use this data to determine the permeability of free space
- Slinky Solenoid Lab: Students derive an algebraic relationship between coils and magnetic field, then determine the quality of their relationship through graphing data they collected
- R-L Circuits Lab: Students set up an RL circuit, predict the shapes of voltage-time and current-time graphs, check their predictions, and determine which factors influence the time needed for the capacitor to charge

### CR8

The syllabus must include an explicit statement that students are required to maintain a lab notebook or portfolio (hard copy or electronic) that includes all their lab reports.

### CR6

The syllabus must include an explicit statement that at least 25% of instructional time is spent engaged in hands-on laboratory investigations, with an emphasis on inquiry-based labs.

### CR7

The syllabus must include a title and brief description for each laboratory investigation. The labs listed should be representative of the topics outlined in the AP Physics C: Electricity and Magnetism Course and Exam Description.