PHSX - Physics

PHSX 205. College Physics I. 4 Credits. (3 Lec, 1 Lab) F,S,Su
PREREQUISITE: High school trigonometry or M 151Q or (Math Level 4 or Higher). First semester of sequence. Topics include kinematics and dynamics of linear and rotational motion; work and energy; impulse and momentum; and fluids. Students will not receive credit if they have passed PHSX 220 or PHSX 240. Common exams.

PHSX 207. College Physics II. 4 Credits. (3 Lec, 1 Lab) F,S,Su
PREREQUISITE: PHSX 205 or PHSX 220. Second semester of sequence. Topics include simple harmonic motion; electric forces and fields; dc electric circuits; magnetic forces and fields; and magnetic induction and motors. Students will not receive credit if they have passed PHSX 222 or PHSX 242. Common exams.

PHSX 220. Physics I (w/ calculus). 4 Credits. (3 Lec, 1 Lab) F,S,Su
COREQUISITE: M 171Q or M 181Q First semester of a three-semester sequence primarily for engineering and physical science students. Covers topics in mechanics (such as motion, Newton's laws, conservation laws, work, energy, systems of particles, and rotational motion) and in mechanical waves (such as oscillations, wave motion, sound, and superposition). Common exams.

PHSX 222. Physics II (w/ calculus). 4 Credits. (3 Lec, 1 Lab) F,S,Su
PREREQUISITE: PHSX 220 or PHSX 240; M 172Q or M 181Q. COREQUISITE: M 172Q or M 182Q. Covers topics in electricity and magnetism (such as Coulomb's law, Gauss' law, electric fields, electric potential, dc circuits, magnetic fields, Faraday's law, ac circuits, and Maxwell's equations) and optics (such as light, geometrical optics, and physical optics). Common exams.

PHSX 224. Physics III. 4 Credits. (3 Lec, 1 Lab) F,S,Su
PREREQUISITE: PHSX 222 or PHSX 242; M 172Q or M 182Q. Covers topics in thermodynamics (such as temperature, heat, laws of thermodynamics, and the kinetic theory of gases) and modern physics (such as relativity; models of the atom; quantum mechanics; and atomic, molecular, solid state, nuclear, and particle physics).

PHSX 401. Physics by Inquiry I. 3 Credits. (3 Lab) Su
PREREQUISITE: Teacher Certification. An in-depth and hands-on exploration of basic physics principles. Scientific model building and proportional reasoning skills will be developed in the context of dc electrics, one and two dimensional kinematics, and dynamics. For middle school and high school science teachers.

PHSX 402. Physics by Inquiry II. 3 Credits. (3 Lab) Su
PREREQUISITE: PHSX 401. An in-depth and hands-on exploration of basic physics principles. Scientific model building and proportional reasoning skills will be developed in the context of light, color, geometrical optics, heat, and temperature. For middle school and high school teachers.

PHSX 491. Special Topics. 1-4 Credits. (1-4 Lec; 12 cr max) On Demand
Max 12 cr. PREREQUISITE: Course prerequisites as determined for each offering. Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.
PHSX 511. Astronomy for Teachers. 3 Credits. (3 Rct) F,S,Su
PREREQUISITE: Graduate standing; Currently certified middle and high school
teachers with one year of teaching experience; This is an online, distance education
course primarily intended for science educators. Topics include: the laws of gravity
and orbital dynamics, a survey of the solar system, stars and stellar evolution,
galaxies, and Big Bang cosmology.

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PHSX 513. Quantum Mechanics Online. 3 Credits. (3 Lec) Su alternate years, to
be offered even years.
PREREQUISITE: Graduate standing; Currently certified high school teachers
with one year of teaching experience; an introductory knowledge of quantum mechanical
theory and use quantum mechanics to understand the behavior of matter. This online
course addresses the key ideas behind quantum mechanical predictions and
develops use of the fundamental behavior of electrons and photons. Designed for
practicing high school physics teachers. Assignments and discussions use electronic
computer conferencing and simulation software.

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PHSX 571. Electric Circuits and Magnetism for Teachers. 2 Credits. (2 Lec) Su
PREREQUISITE: Graduate standing; science educator; interest in science. This
2-credit graduate course is designed for practicing teachers who are teaching
or plan to teach electricity and magnetism as part of the science curriculum in their
classrooms. Its broad purpose is to introduce core concepts in electric circuits and
magnetism. The course aims to help teachers by increasing their understanding
of the underlying physics so that they may use their curricular materials more
effectively.

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PHSX 574. World of Motion for Teachers. 1 Credit. (1 Lec) Su
PREREQUISITE: Graduate standing; science educator; interest in science. In
this 6-week course for teachers we will focus on the core ideas of measurement
and motion, as they appear in modern inquiry-oriented science education. The
course aims to help teachers use modern curricular materials more effectively by
increasing their understanding of the physics concepts.

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PHSX 576. World of Force for Teachers. 1 Credit. (1 Lec) Su
PREREQUISITE: Graduate standing; science educator; interest in science. This 1-
credit course is designed for teachers who are exploring the concepts of forces in
their classrooms. Its broad purpose is to introduce elementary and middle school
teachers to core ideas about forces, as they relate to modern, inquiry-oriented
science curricular materials. The course aims to help teachers use such materials
more effectively by increasing their understanding of physics concepts. It is not a
course in how to use a particular curriculum.

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PHSX 591. Special Topics. 1-4 Credits. (1 Lec; 12 cr max) On Demand
Max 12 cr. PREREQUISITE: Upper division courses and others as determined for
each offering. Courses not required in any curriculum for which there is a particular
one time need, or given on a trial basis to determine acceptability and demand
before requesting a regular course number.

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PHSX 594. Seminar. 1 Credit. (1 Sem; 8 cr max) On Demand Max 8 cr. PREREQUISITE: Graduate standing or seniors by petition. Course
prerequisites as determined for each offering. Topics offered at the graduate level
which are not covered in regular courses. Students participate in preparing and
presenting discussion material.

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PHSX 595. Teaching Mechanics Using Research-based Curriculum. 2 Credits. (1 Lec. 1 Lab) Su
PREREQUISITES: Teacher of science with a minimum of two years teaching experience. This course prepares participants to teach a mechanics course built around Tutorials in Introductory Physics (McDermott, et al.). This research-based curriculum was designed to be used in recitations to augment traditional lecture courses operating essentially independent of the lecture. The course will model both the student-centered tutorial instruction and the supporting active-engagement lectures for a selection of topics from the first semester of the two-semester sequence.

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PHSX 596. Teaching Electricity & Magnetism for Teachers. 2 Credits. (1 Lec. 1 Lab) Su
Participants will learn how to teach an integrated course built around Tutorials in Introductory Physics (McDermott, et al.). This research-based curriculum challenges students to confront their misconceptions and build gut-level models of the key concepts of electricity and magnetism. The course will showcase both the student-centered tutorial instruction and the supporting active-engagement Powerpoint lectures. We will also review the physics education research literature that provides the foundation for these curricular materials.

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Font Notice

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

Times was used instead of Adobe Garamond Pro.

The editor may contact Leepfrog for a draft with the correct fonts in place.