NEW JERSEY CENTER
FOR TEACHING & LEARNING

ONLINE COURSE CATALOG

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The New Jersey Center for Teaching and Learning (NJCTL) offers online courses for teachers to learn its teaching methods as well as the content, and how to teach that content to high school and early college students of chemistry, mathematics, and physics.

These courses can be used to fulfill the academic requirement of an endorsement to teach high school chemistry, mathematics, and physics in the state of New Jersey.

These courses also qualify for graduate credits from Colorado State University's-Global Campus (CSU-G), a regionally accredited institute of higher education. These graduate credits may be used to qualify for teacher certification or endorsement in many states and/or to help meet subject area requirements to teach dual enrollment courses in chemistry, mathematics, and physics.

Up to 18 of those graduate credits may also be used towards a CSU-G 36-credit Master's Degree.

These courses are brought to you by the #1 producer of physics teachers in the United States.

contact us at info@njctl.org

Learn to use **free, editable** materials to improve student outcomes.

Learn online: anytime, anywhere

Reduce stress for you and your students.

Earn grad credits and a path to a Masters.

Reduce district costs by eliminating textbooks.

MATHEMATICS COURSES

PMI TEACHING METHODS FOR MATHEMATICS

Credits: 2
Prerequisite: None

Teachers will learn to instruct students using research-proven Progressive Teaching Initiative methods. Specific topics include curriculum, pedagogy, technology, formative & summative assessment, grading, pacing, and how these topics are woven together to create a highly effective teaching and learning environment for mathematics.

LEARNING & TEACHING PRE-ALGEBRA

Credits: 4
Prerequisite: None

This introductory course is for teachers to learn the content of *PMI Pre-Algebra* and how to teach that course, and the middle school courses upon which it is based, to students. The course focuses on numeracy, as well as algebraic and graphical representations of linear relationships. All future study of mathematics requires a full understanding of these topics, which include numbers and operations; scientific notation; expressions; solving and graphing equations & inequalities; ratios & proportions; percentages; and probability & statistics.

MS MATHEMATICS FIELD EXPERIENCE I

Credits: 3
Prerequisites: MATH6101, MATH6401, & MATH6403, or Instructor Approval

This is the first of two field experience courses in which candidates teach at least one section of middle school mathematics to students. Learners will develop a deeper understanding of PMI mathematics content and teaching methods. Content topics will be drawn from MATH6401 or MATH6403. Methods topics include dynamic, brief direct instruction; polling-facilitated formative assessment; social constructivism; and mastery-based summative assessment.

LEARNING & TEACHING ALGEBRA I

Credits: 5
Prerequisite: MATH6401 or Instructor Approval

This course is for teachers to learn the content of *PMI Algebra I* and how to teach that course to students. Topics include numbers, operations & expressions; equations; graphing linear equations; systems of linear equations; solving & graphing linear inequalities; solving absolute value equations & inequalities; quantitative reasoning; functions; exponential functions; polynomials; quadratic equations; non-linear functions; and data & statistical analysis.

MS MATHEMATICS FIELD EXPERIENCE II

Credits: 3
Prerequisites: MATH6402 or Instructor Approval

This is the second of two field experience courses in which candidates teach at least one section of middle school mathematics to students. Learners will develop a deeper understanding of PMI mathematics content and teaching methods. Content topics will be drawn from MATH6401 or MATH6403. Methods topics include dynamic, brief direct instruction; polling-facilitated formative assessment; social constructivism; and mastery-based summative assessment.

MATHEMATICS COURSES

LEARNING & TEACHING GEOMETRY

Credits: 5

Prerequisite: MATH6403 or Instructor Approval

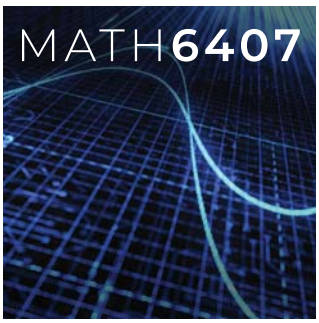
This course is for teachers to learn the content of *PMI Geometry* and how to teach that course to students. It provides teachers a background in Euclidean Geometry, focusing on using deductive reasoning and proofs to develop a conceptual understanding of geometric properties. Topics include points, lines & planes; angles; triangles; similar triangles & trigonometry; congruent triangles; circles; analytic geometry; transformations; quadrilaterals; area of figures, 3-D geometry; and probability.

HS MATHEMATICS FIELD EXPERIENCE I

Credits: 3

Prerequisites: MATH6101, MATH6401, & MATH6403, and MATH6405 (for Geometry field experience only), or Instructor Approval

This is the first of two field experience courses in which candidates teach at least one section of high school mathematics to students. Learners will develop a deeper understanding of PMI mathematics content and teaching methods. Content topics will be drawn from MATH6403 or MATH6405. Methods topics include dynamic, brief direct instruction; polling-facilitated formative assessment; social constructivism; and mastery-based summative assessment.



LEARNING & TEACHING ALGEBRA II

Credits: 6

Prerequisite: MATH 6405 or Instructor Approval

This course is for teachers to learn the content of *PMI Algebra II* and how to teach that course to students. Topics include an overview of functions; linear & absolute value functions; quadratic equations & complex numbers; quadratic functions; polynomial functions; rational functions; radical functions & rational exponents; exponential & logarithmic functions; sequences & series; trigonometric functions; and probability & statistics.

HS MATHEMATICS FIELD EXPERIENCE II

Credits: 3

Prerequisite: MATH6406 or Instructor Approval

This is the second of two field experience courses in which candidates teach at least one section of high school mathematics to students. Learners will develop a deeper understanding of PMI mathematics content and teaching methods. Content topics will be drawn from MATH6403 or MATH6405. Methods topics include dynamic, brief direct instruction; polling-facilitated formative assessment; social constructivism; and mastery-based summative assessment.

LEARNING & TEACHING PRECALCULUS

Credits: 6

Prerequisite: MATH6407 or Instructor Approval

This course is for teachers to learn the content of *PMI Precalculus* and how to teach that course to students. Topics include functions; polynomial & rational functions; exponential & logarithmic functions; conic sections; trigonometric functions; analytic trigonometry; polar coordinates & parametric equations; systems & matrices; vectors; and sequences & series.

MATHEMATICS COURSES

MS MATHEMATICS CAPSTONE & PRAXIS PREPARATION

Credits: 2
Prerequisite: MATH6405 or Instructor Approval

This course is for teachers to review and extend their prior study of mathematics in the realms of numbers & operations; algebra; functions and their graphs; geometry & measurement; and probability, statistics & discrete mathematics. This capstone course also serves as a review for the Middle School Mathematics Content Knowledge Praxis Test (5169).

HS MATHEMATICS CAPSTONE & PRAXIS PREPARATION

Credits: 4
Prerequisite: MATH6409 or Instructor Approval

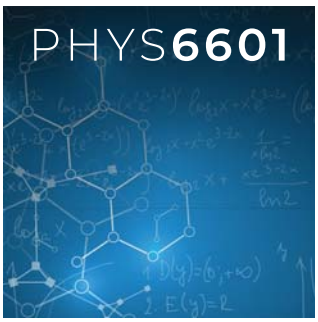
This course is for teachers to review and extend their prior study of mathematics in the realms of number & quantity; algebra; functions; calculus; geometry; probability & statistics; and discrete mathematics. This capstone course also serves as a review for the Mathematics Content Knowledge Praxis Test (5161).

PHYSICS COURSES

PSI TEACHING METHODS FOR PHYSICS

Credits: 2
Prerequisite: None

Teachers will learn to instruct students using research-proven Progressive Science Initiative methods. Specific topics include curriculum, pedagogy, technology, formative & summative assessment, grading, pacing, and how these topics are woven together to create a highly effective teaching and learning environment for physics.

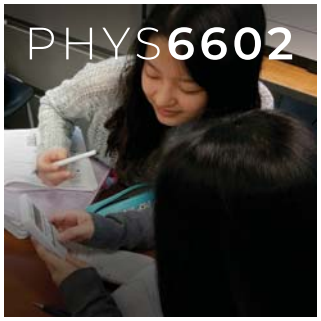


LEARNING & TEACHING PSI ALGEBRA-BASED PHYSICS

Credits: 6
Prerequisite: None

This introductory course is for teachers to learn the content of *PSI Algebra-Based Physics* and how to teach that course to students. This is a mathematically rigorous physics course that reinforces student knowledge of algebra as applied to one dimensional physics problems, while providing the foundation for studying advanced physics, chemistry, and biology. Topics include mechanics, electricity and magnetism, waves, and modern physics.

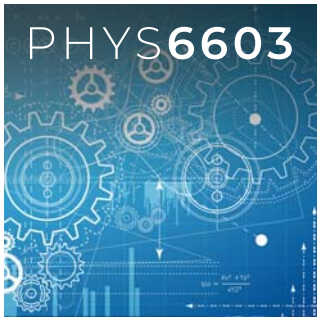
PHYSICS COURSES



PHYSICS FIELD EXPERIENCE I

Credits: 3
Prerequisite: PHYS6101 and PHYS6601, or Instructor Approval

This is the first of two field experience courses in which candidates teach at least one section of PSI Physics to students. Learners will develop a deeper understanding of PSI physics content and teaching methods. Content topics will be drawn from PHYS6601. Methods topics include dynamic, brief direct instruction; polling-facilitated formative assessment; social constructivism; and mastery-based summative assessment.



LEARNING & TEACHING ADVANCED PHYSICS I

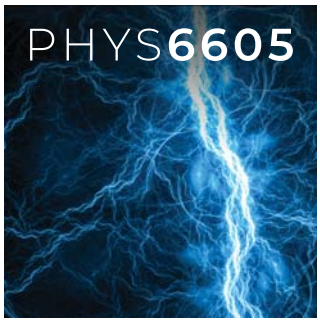
Credits: 5
Prerequisite: PHYS6601 or Instructor Approval

This course is for teachers to learn the content of *PSI Advanced Placement Physics 1* and how to teach that course to students, while providing teachers a greater depth of understanding to support their teaching of *PSI Algebra-Based Physics*. Topics include vector analysis, kinematics in two dimensions, dynamics in two dimensions, Newtonian gravitation, rotational motion, conservation of energy and momentum, waves, electric force, and circuits.

PHYSICS FIELD EXPERIENCE II

Credits: 3
Prerequisite: PHYS6602 or Instructor Approval

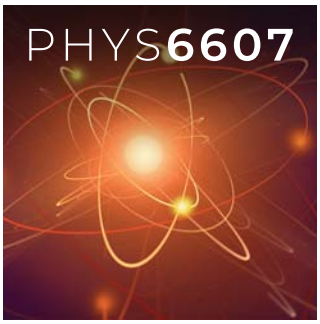
This is the second of two field experience courses in which candidates teach at least one section of PSI Physics to students. Learners will develop a deeper understanding of PSI physics content and teaching methods. Content topics will be drawn from PHYS6601. Methods topics include dynamic, brief direct instruction; polling-facilitated formative assessment; social constructivism; and mastery-based summative assessment.



LEARNING & TEACHING ADVANCED PHYSICS II

Credits: 6
Prerequisite: PHYS6603 or Instructor Approval

This course is for teachers to learn the content of *PSI Advanced Placement Physics 2* and how to teach that course to students, while providing teachers a greater depth of understanding to support their teaching of *PSI Algebra-Based Physics*. Topics include two-dimensional electric force and field, electric potential and capacitors, electric current, magnetism, electromagnetic induction, electromagnetic waves, geometric optics, fluids, thermal physics, and modern physics.



PHYSICS CAPSTONE & PRAXIS PREPARATION

Credits: 5
Prerequisite: PHYS6605 or Instructor Approval

This course is for teachers to review and extend their prior study of physics in the realms of mechanics (including fluids); electricity; magnetism & electromagnetic induction; optics & waves; thermal physics; modern physics; and special relativity. This capstone course also serves as a review for the Praxis Physics Content Knowledge Test (5265).

PHYSICS COURSES

LEARNING & TEACHING CALCULUS-BASED PHYSICS: MECHANICS

Credits: 4

Prerequisite: PHYS6603 or Instructor Approval

This course is for teachers to learn the content of *PSI Advanced Placement Physics C: Mechanics* and how to teach that course to students. Topics include vectors, one & two-dimensional kinematics, dynamics, energy, momentum, rotational motion, universal gravitation, and simple harmonic motion.

LEARNING & TEACHING CALCULUS-BASED PHYSICS: ELECTRICITY AND MAGNETISM

Credits: 4

Prerequisite: PHYS6605 or Instructor Approval

This course is for teachers to learn the content of *PSI Advanced Placement Physics C: Electricity and Magnetism* and how to teach that course to students. Topics include electric charge & field, electric potential & capacitance, current, circuits, magnetic field & forces, inductance, and alternating current.

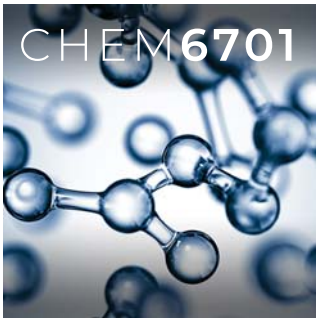
CHEMISTRY COURSES

PSI TEACHING METHODS FOR CHEMISTRY

Credits: 2

Prerequisite: None

Teachers will learn to instruct students using research-proven Progressive Science Initiative methods. Specific topics include curriculum, pedagogy, technology, formative & summative assessment, grading, pacing, and how these topics are woven together to create a highly effective teaching and learning environment for chemistry.



LEARNING & TEACHING CHEMISTRY

Credits: 6

Prerequisite: None

This introductory course is for teachers to learn the content of *PSI Chemistry* and how to teach that course to students. This is a mathematically rigorous chemistry course that builds upon foundational topics in physics and leads to a better understanding of biology. Topics include atomic structure, chemical reactions, stoichiometry, kinetics, and equilibrium.

CHEMISTRY COURSES

CHEMISTRY FIELD EXPERIENCE I

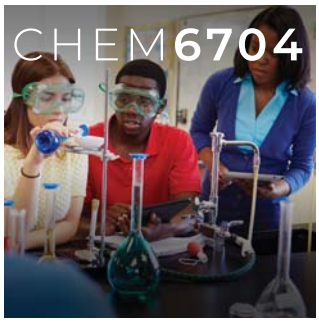
Credits: 3
Prerequisites: CHEM6101 and CHEM6701, or Instructor Approval

This is the first of two field experience courses in which candidates teach at least one section of *PSI Chemistry* to students. Learners will develop a deeper understanding of PSI chemistry content and teaching methods. Content topics will be drawn from CHEM6701. Methods topics include dynamic, brief direct instruction; polling-facilitated formative assessment; social constructivism; and mastery-based summative assessment.

LEARNING & TEACHING ADVANCED CHEMISTRY I

Credits: 5
Prerequisite: CHEM6701 or Instructor Approval

This course is for teachers to learn topics from the first half of *PSI Advanced Placement Chemistry* and how to teach those topics to students, while providing teachers a greater depth of understanding to support their teaching of *PSI Chemistry*. Topics include atomic structure, compounds, stoichiometry, and solutions.



CHEMISTRY FIELD EXPERIENCE II

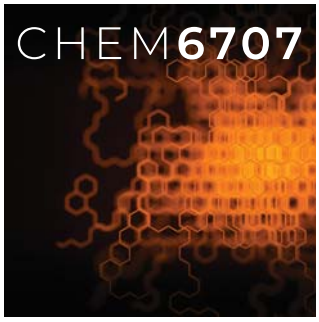
Credits: 3
Prerequisite: CHEM6702 or Instructor Approval

This is the second of two field experience courses in which candidates teach at least one section of *PSI Chemistry* to students. Learners will develop a deeper understanding of PSI chemistry content and teaching methods. Content topics will be drawn from CHEM6701. Methods topics include dynamic, brief direct instruction; polling-facilitated formative assessment; social constructivism; and mastery-based summative assessment.

LEARNING & TEACHING PSI ADVANCED CHEMISTRY II

Credits: 6
Prerequisite: CHEM6703 or Instructor Approval

This course is for teachers to learn topics from the second half of *PSI Advanced Placement Chemistry* and how to teach those topics to students, while providing teachers a greater depth of understanding to support their teaching of *PSI Chemistry*. Topics include kinetics, equilibrium, thermochemistry, and electrochemistry.



CHEMISTRY CAPSTONE & PRAXIS PREPARATION

Credits: 5
Prerequisite: CHEM6705 or Instructor Approval

This course is for teachers to review and extend their prior study of chemistry in the realms of basic principles of matter and energy; periodicity; thermodynamics; organic chemistry; and biochemistry. The course is intended to provide teachers a greater depth of concept mastery to support their teaching of *PSI Chemistry* and enable them to teach *PSI Advanced Placement Chemistry*. This capstone course also serves as a review for the Chemistry Praxis Content Knowledge Test (5245).

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NJCTL's mission is to empower teachers to lead school improvement so that all children have access to a high-quality education.

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