



NEW JERSEY CENTER
FOR TEACHING & LEARNING

ONLINE COURSE CATALOG



TEACHING METHODS



MET 6101 PSI-PMI TEACHING METHODS

Credits: 2

Prerequisite: None

Teachers will learn how to use research-proven approaches to create a highly effective and welcoming learning environment for their students. Pedagogy topics include social constructivism, metacognition, differentiation, and meeting the needs of English language learners. Policy topics include grading based on mastery, why homework should not be graded, and providing retests to encourage continuous improvement.



MET 6102 PSI-PMI FIELD EXPERIENCE I

Credits: 3

This is the first of two coached field experience courses in which candidates teach at least one section of *PSI Physics* or *Chemistry*, *PMI Mathematics* (MS or K-12), *PSI Middle School Science*, or *Computer Science* to students. Learners will develop a deeper understanding of *PSI*, *PMI*, or *Computer Science* content and teaching methods. Content topics will be drawn from prerequisite coursework.



MET 6104 PSI-PMI FIELD EXPERIENCE II

Credits: 3

This is the second of two field experience courses in which candidates teach at least one section of *PSI Physics*, *Chemistry*, *PMI Mathematics* (MS or K-12), *PSI Middle School Science*, or *Computer Science* to students. Learners will continue to deepen their understanding of *PSI*, *PMI*, or *Computer Science* content and teaching methods.

MATHEMATICS COURSES



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.

MATHEMATICS COURSES



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, transformations of functions, exponential functions, polynomials, quadratic equations, non-linear functions, and data & statistical analysis.

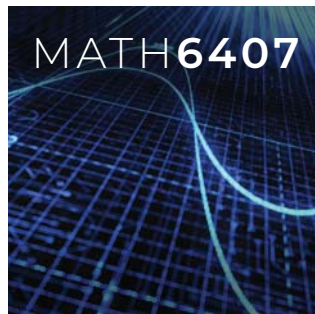


LEARNING & TEACHING GEOMETRY

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.

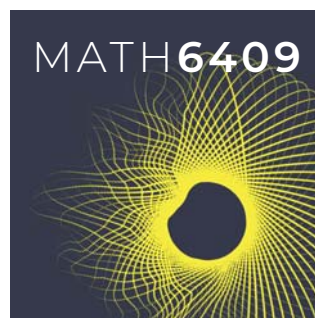


LEARNING & TEACHING ALGEBRA II

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, transformations of functions, sequences & series, trigonometric functions, and probability & statistics.

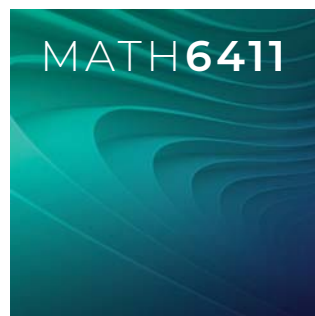


LEARNING & TEACHING PRECALCULUS

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.



LEARNING & TEACHING MS MATHEMATICS PRAXIS PREPARATION

Credits: 2

Prerequisite: MATH6405 or Instructor Approval

This course prepares teachers for the Middle School Mathematics Praxis examination (5169). It includes 5 units, each containing problem solving notebooks, with embedded review; mastery questions with solutions; a discussion board, where questions are addressed by certified instructors; and a unit test. A 6th unit includes one full length Praxis-style test.

MATHEMATICS COURSES



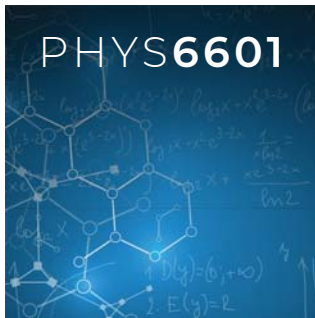
LEARNING & TEACHING K-12 MATHEMATICS PRAXIS PREPARATION

Credits: 4

Prerequisite: MATH6409 or Instructor Approval

This course prepares teachers for the Mathematics: Content Knowledge Praxis examination (5161). It includes 9 units, each containing problem solving notebooks, with embedded review; mastery questions with solutions; a discussion board, where questions are addressed by certified instructors; and a unit test. A 10th unit includes one full length Praxis-style test.

PHYSICS COURSES



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.



LEARNING & TEACHING AP PHYSICS I

Credits: 5

Prerequisite: PHYS6601 or Instructor Approval

Teachers will learn AP Physics 1 and how to teach that course to students using NJCTL's free, editable, classroom course materials. Topics include: vector analysis, 2D kinematics & dynamics, circular motion & universal gravitation, rotational motion, energy & momentum, simple harmonic motion, waves & sound waves, and electric force & circuits.



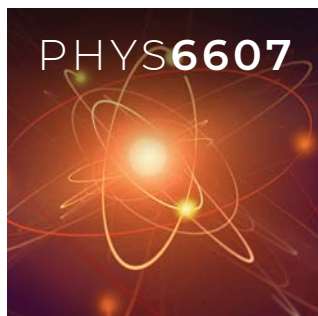
LEARNING & TEACHING AP PHYSICS II

Credits: 6

Prerequisite: PHYS6603 or Instructor Approval

Teachers will learn AP Physics 2 and how to teach that course to students using NJCTL's free, editable classroom course materials. Topics include, 2D electric forces & fields, electric potential & capacitors, electric current & RC-circuits, magnetism & electromagnetic induction, electromagnetic waves, geometric optics, fluids, thermal physics, quantum physics & atomic models, and nuclear physics.

PHYSICS COURSES



PHYS6607

PHYSICS PRAXIS PREPARATION

Credits: 5

Prerequisite: PHYS6605 or Instructor Approval

This course prepares teachers for the Physics: Content Knowledge Praxis examination (5265). It includes 8 modules, each containing problem solving notebooks, with embedded review; mastery questions with solutions; a discussion board, where questions are addressed by certified instructors; and a unit test. A 9th module includes two full length Praxis-style tests.



PHYS6631

LEARNING & TEACHING AP PHYSICS C: MECHANICS

Credits: 4

Prerequisite: PHYS6603 or Instructor Approval

This course is for teachers to learn the content of *PSI AP 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.



PHYS6633

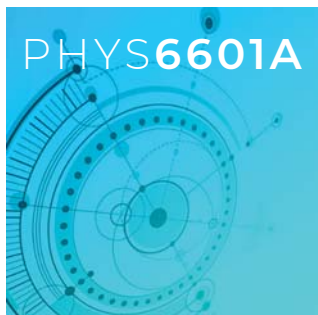
LEARNING & TEACHING AP PHYSICS C: ELECTRICITY AND MAGNETISM

Credits: 4

Prerequisite: PHYS6605 or Instructor Approval

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

ALGEBRA-BASED PHYSICS MINI-COURSES



PHYS6601A

MECHANICS

Credits: 2

Prerequisite: None

This introductory course is for teachers to learn the mechanics topics of *PSI Algebra-Based Physics* and how to teach them to students. These topics include kinematics, dynamics, uniform circular motion, universal gravitation, energy, and momentum.

PHYSICS COURSES



ELECTRICITY & MAGNETISM

Credits: 2

Prerequisite: None

This introductory course is for teachers to learn the electricity & magnetism topics of *PSI Algebra-Based Physics* and how to teach them to students. These topics include electric charge & force, electric field & potential, electric currents & circuits, magnetism, and electromagnetic induction.



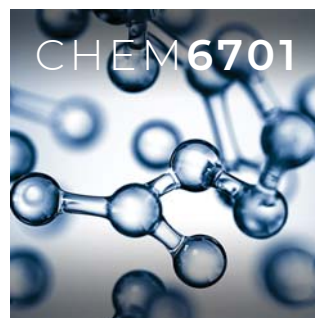
WAVES, QUANTUM & NUCLEAR PHYSICS

Credits: 2

Prerequisite: None

This introductory course is for teachers to learn the waves, quantum & nuclear physics topics of *PSI Algebra-Based Physics* and how to teach them to students. These topics include simple harmonic motion, sound & electromagnetic waves, quantum physics & atomic models, and nuclear physics.

CHEMISTRY COURSES

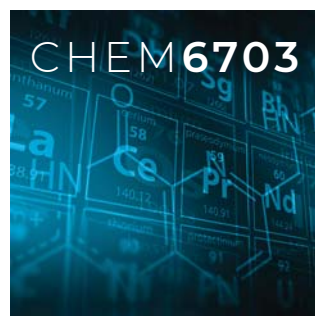


LEARNING & TEACHING CHEMISTRY

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.



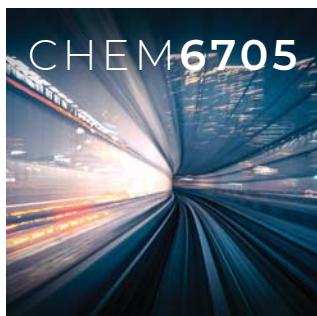
LEARNING & TEACHING AP CHEMISTRY - PART I

Credits: 5

Prerequisite: CHEM6701 or Instructor Approval

This course is for teachers to learn topics from the first half of *PSI AP 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 COURSES

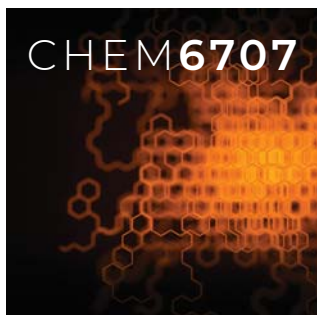


LEARNING & TEACHING AP CHEMISTRY - PART II

Credits: 6

Prerequisite: CHEM6703 or Instructor Approval

This course is for teachers to learn topics from the second half of *PSI AP 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 prepares teachers for the Chemistry: Content Knowledge Praxis examination (5245). It includes 7 modules, each containing problem solving notebooks, with embedded review; mastery questions with solutions; a discussion board, where questions with solutions; a discussion board, where questions are addressed by certified instructors; and a unit test. An 8th module includes two full length Praxis-style tests.

CHEMISTRY MINI-COURSES

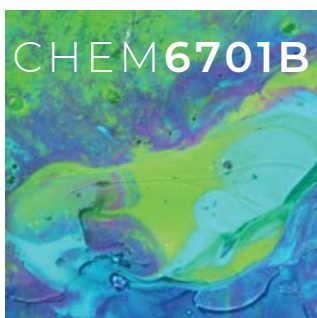


LEARNING & TEACHING CHEMISTRY: ATOMIC STRUCTURE & CHEMICAL BONDING

Credits: 2

Prerequisite: None

This introductory course is for teachers to learn the atomic structure & chemical bonding topics of *PSI Chemistry* and how to teach them to students. These topics include atomic origins, atomic structure, the periodic table, ionic bonding & ionic compounds, and covalent bonding & molecular compounds.



LEARNING & TEACHING: CHEMICAL REACTIONS & QUANTITIES

Credits: 2

Prerequisite: None

This introductory course is for teachers to learn the chemical reactions & quantities topics of *PSI Chemistry* and how to teach them to students. These topics include intermolecular forces, mole calculations, chemical reactions, and stoichiometry.

CHEMISTRY MINI-COURSES



LEARNING & TEACHING: ENERGY & EQUILIBRIUM

Credits: 2

Prerequisite: None

This introductory course is for teachers to learn the energy & equilibrium topics of *PSI Chemistry* and how to teach them to students. These topics include gases, thermochemistry, acids & bases, and kinetics & equilibrium.

COMPUTER SCIENCE COURSES



LEARNING & TEACHING AP COMPUTER SCIENCE PRINCIPLES - PART I

Credits: 3

Prerequisite: None

This course is for teachers to learn the content of *PSI AP Principles* and how to teach that course to students. It focuses on fundamental programming skills and thought processes required for successful programming in any language while integrating components of Python. Topics include an introduction to programming, operators & logic, algorithms & control structures, lists, and functions & procedures.



LEARNING & TEACHING AP COMPUTER SCIENCE PRINCIPLES - PART II

Credits: 3

Prerequisite: CSCI 6309 or Instructor Approval

This course is for teachers to learn the content of *PSI AP Principles* and how to teach that course to students. It focuses on fundamental understanding of computers, networking and life in a digital world. Programming skills will be deepened throughout this course. Topics include the global impact of computing, bits & bytes, data & privacy, graphics & images, and the Internet & networking.



LEARNING & TEACHING AP COMPUTER SCIENCE PRINCIPLES - PART I

Credits: 5

Prerequisite: None

This course is for teachers to learn the content of *PSI AP Computer Science A* and how to teach that course to students. It focuses on fundamental programming skills and thought processes required for successful programming in any language while integrating components of Java. Topics include fundamentals of programming, control statements & loops, methods & arrays, and strings.

COMPUTER SCIENCE COURSES



LEARNING & TEACHING AP COMPUTER SCIENCE - PART II

Credits: 5
Prerequisite: None

This course is for teachers to learn the content of *PSI Advanced Placement Computer Science A* and how to teach that course to students. It focuses on object-oriented programming skills and thought processes required for successful programming in any language while integrating components of Java. Topics include classes, array lists, inheritance & polymorphism, recursion, and searching & sorting.

MIDDLE SCHOOL SCIENCE COURSES



LEARNING & TEACHING PHYSICAL ENVIRONMENT

Credits: 3
Prerequisite: None

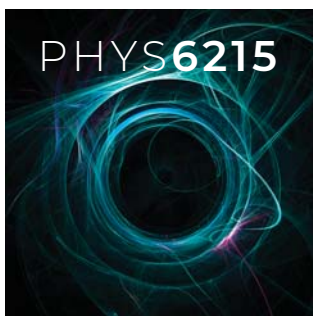
This course is designed for those who are currently teaching, or preparing to teach, middle school science. Learners will develop a strong scientific understanding of the science behind phenomena seen in the physical world. Topics include states of matter, air flow & pressure, earth-sun-moon system, seasons, basic chemistry and factors impacting our changing climate.



LEARNING & TEACHING LIVING ENVIRONMENT

Credits: 3
Prerequisite:

This course is designed for those who are currently teaching, or preparing to teach, middle school science. Learners will develop a strong scientific understanding of the science behind phenomena seen in the living world. Topics include bacteria, prokaryotes, eukaryotes, cellular structure & function, reproduction & heredity, biodiversity, ecology, ecosystems, populations, and basic chemistry to support the understanding of these topics.



LEARNING & TEACHING MATHEMATICAL PHYSICS

Credits: 3
Prerequisite:

This course is designed for those who are currently teaching, or preparing to teach, middle school science. Learners will develop a strong scientific understanding of the science behind phenomena seen in the living world. Topics include constant speed & motion, acceleration, force, momentum, work & energy, kinetic energy, gravitation.

MIDDLE SCHOOL SCIENCE COURSES



MS SCIENCE CAPSTONE & PRAXIS PREPARATION

Credits: 4

Prerequisite: None

This capstone course is for teachers to learn and further topics in preparation for the Middle School Science Praxis exam, as well as to prepare to teach middle school science to students. This capstone serves as a review for the Praxis Chemistry Content Test which includes the following topics: scientific inquiry, methodology, techniques & history; matter & energy; physical science; life science; earth & space science; and science, technology & society.



NEW JERSEY CENTER
FOR TEACHING & LEARNING

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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