

SLOs for PSME Division- Active Only

Course/Service Owning Unit	Student Learning Outcome (SLO) Name	Student Learning Outcome (SLO)
Dept - (PSME) Astronomy	ASTR10_SLO_1	Appraise the benefits to society of astronomical research concerning stars and stellar systems.
	ASTR10_SLO_2	Evaluate the impact on Earth's characteristics of the evolution of stars and stellar systems.
	ASTR10_SLO_3	Evaluate astronomical news items or theories about stellar astronomy based upon the scientific method.
	ASTR15L_SLO_1	Evaluate claims about the nature of the physical universe using the scientific method of hypothesis testing.
	ASTR15L_SLO_2	Compare and contrast the histories of solar-system bodies (e.g. moons, planets, asteroids, comets, meteorites) by integrating data from spacecraft and Earth-based observatories.
	ASTR4_SLO_1	Appraise the benefits to society of planetary research and exploration.
	ASTR4_SLO_2	Compare and contrast the development of planetary systems and of the major planet types, including those factors that have led to Earth's unique characteristics.
	ASTR4_SLO_3	Evaluate astronomical news items or theories concerning solar system astronomy based upon the scientific method.
	Dept - (PSME) Chemistry	CHEM10_SLO_3
CHEM10_SLO_4		Demonstrate an understanding of the scientific method by performing laboratory experiments
CHEM12A_SLO_5		Predict products in reactions of alkanes, haloalkanes, and alkenes by applying concepts from General Chemistry
CHEM12A_SLO_6		Generate logical stepwise reaction mechanisms for simple organic reactions
CHEM12A_SLO_7		Construct molecular structures from IR and ¹ H NMR data
CHEM12B_SLO_5		Construct logical multi-step syntheses for organic molecules incorporating a variety of functional groups.
CHEM12B_SLO_6		Use molecular orbital theory and resonance to explain reactions of conjugated dienes, benzene and other molecules with conjugated p systems
CHEM12B_SLO_7		Construct molecular structures of increasingly complex molecules from IR, ¹ H NMR, and ¹³ C NMR data
CHEM12C_SLO_5		Generate logical multi-step syntheses for increasingly complex organic molecules incorporating a wider variety of functional groups
CHEM12C_SLO_6		Apply concepts demonstrated in previous organic reactions to understand the behavior of biologically important molecules and concepts in Biochemistry
CHEM1A_SLO_4		Solve problems related to balanced chemical equations and illustrate the principles of stoichiometry.
CHEM1A_SLO_5		Demonstrate an understanding of the scientific method by performing laboratory experiments.
CHEM1B_SLO_5		Solve problems related to chemical equilibrium.
CHEM1B_SLO_6		Demonstrate an understanding of the fundamental principles of kinetics, equilibrium, and thermodynamics by performing appropriate laboratory experiments.
CHEM1C_SLO_4		Combine principles of equilibrium and thermodynamics and solve problems related to electrochemical systems.
CHEM1C_SLO_5		Analyze unknown inorganic salts qualitatively and identify the cations and anions present in them.
CHEM30A__SLO_6		Identify the differences between elements and compounds and describe the chemical bonding in compounds- ionic vs. covalent.
CHEM30A_SLO_4	Solve stoichiometric problems pertaining to reactions between acids and bases.	

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	CHEM30B_SLO_1	Differentiate the general reactions of the principle organic functional groups.
	CHEM30B_SLO_2	Evaluate the major classes of biological compounds from a chemical perspective.
	CHEM50_SLO_1	Assess the fundamental concepts of modern atomic and molecular theory.
	CHEM50_SLO_2	Evaluate the standard classes of chemical reactions.
	CHEM50_SLO_3	Demonstrate a fundamental understanding of mathematical concepts pertaining to chemical experimentation and calculations.
Dept - (PSME) Engineering	ENGR10_SLO_1	The student will be able to analyze, graph and develop a formula for a given data set.
	ENGR10_SLO_2	The student will be able to write technical documentation both written and orally.
	ENGR10_SLO_3	The student will work collaboratively on an engineering team.
	ENGR35_SLO_1	The student will be able to analyze two- and three-dimensional force systems on rigid bodies in static equilibrium using vector and scalar analysis methods.
	ENGR37_SLO_1	The student will be able to analyze circuits containing resistive, capacitive, inductive passive elements, along with op-amps interconnected to voltage and current sources.
	ENGR37_SLO_2	The student will be able to use circuit laws and network theorems to solve DC steady state circuits, RC, RL, and RLC DC circuit transients and sinusoidal AC steady state circuits.
Dept - (PSME) Geology	GEOL10_SLO_1	Apply the principles of scientific methodology to evaluate hypotheses on how the earth works as an integrated system.
	GEOL10_SLO_2	Use data and observations to track and predict changes in the Earth system resulting from dynamic Earth Processes.
	GEOL10_SLO_3	Use observations from the crust and lithosphere of the Earth to determine geologic history at hand-sample, outcrop, local, and regional scales.
	GEOL10_SLO_4	Apply scientific methodology and geologic principles to analyze the impact of the Earth system on humanity, from specific natural hazards and the availability, use, and distribution of Earth resources.
	GEOL20_SLO_1	Apply the principles of scientific methodology to test hypotheses as to how the Earth's oceans work as an integrated system.
	GEOL20_SLO_2	Use observations and data to characterize the dynamic Earth processes that act to shape the ocean floor and analyze the record of these processes within marine sediments and oceanic crust.
	GEOL20_SLO_3	Analyze the dynamic movement of the water column of the oceans, through an application of the physical principles of ocean currents, waves, and tides and their effect on coastal systems and processes.
	GEOL20_SLO_4	Apply scientific methodology and the principles of oceanography to analyze the impact of the ocean system on humanity, from specific natural hazards and the availability, use, and distribution of ocean resources.
Dept - (PSME) Mathematics	MATH10_SLO_1	Organize, analyze, and utilize appropriate methods to draw conclusions based on sample data by constructing and/or evaluating tables, graphs, and numerical measures of characteristics of data.
	MATH10_SLO_2	Identify, evaluate, interpret and describe data distributions through the study of sampling distributions and probability theory.

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	MATH10_SLO_3	Collect data, interpret, compose and defend conjectures, and communicate the results of random data using statistical analyses such as interval and point estimates, hypothesis tests, and regression analysis.
	MATH11_SLO_1	Identify, evaluate, and utilize appropriate linear and probability optimization models and communicate results.
	MATH11_SLO_2	Compare, evaluate, judge, make informed decisions, and communicate results about various financial opportunities by applying the mathematical concepts and principles of the time value of money.
	MATH114_SLO_1	Evaluate real-world situations and distinguish between and apply exponential, logarithmic, rational, and discrete function models appropriately.
	MATH114_SLO_2	Analyze, interpret, and communicate results of exponential, logarithmic, rational, and discrete models in a logical manner from four points of view - visual, formula, numerical, and written.
	MATH12_SLO_1	Use correct notation and mathematical precision in the evaluation and interpretation of derivatives and integrals.
	MATH12_SLO_2	Evaluate, solve, interpret and communicate business and social science applications using appropriate differentiation and integration methodologies.
	MATH1A_SLO_1	Analyze and synthesize the concepts of limits, continuity, and differentiation from a graphical, numerical, analytical and verbal approach, using correct notation and mathematical precision.
	MATH1A_SLO_2	Evaluate the behavior of graphs in the context of limits, continuity and differentiability.
	MATH1A_SLO_3	Recognize, diagnose, and decide on the appropriate method for solving applied real world problems in optimization, related rates and numerical approximation.
	MATH1B_SLO_1	Analyze the definite integral from a graphical, numerical, analytical, and verbal approach, using correct notation and mathematical precision.
	MATH1B_SLO_2	Formulate and use the Fundamental Theorem of Calculus.
	MATH1B_SLO_3	Apply the definite integral in solving problems in analytical geometry and the sciences.
	MATH1C_SLO_1	Graphically, analytically, numerically and verbally analyze infinite sequences and series from the perspective of convergence, using correct notation and mathematical precision.
	MATH1C_SLO_2	Apply infinite sequences and series in approximating functions.
	MATH1C_SLO_3	Synthesize and apply vectors, polar coordinate system and parametric representations in solving problems in analytic geometry, including motion in space.
	MATH1D_SLO_1	Graphically and analytically synthesize and apply multivariable and vector-valued functions and their derivatives, using correct notation and mathematical precision.
	MATH1D_SLO_2	Use double, triple and line integrals in applications, including Green's Theorem, Stokes' Theorem and Divergence Theorem.
	MATH1D_SLO_3	Synthesize the key concepts of differential, integral and multivariate calculus.
	MATH201_SLO_1	Place, via test at Placement Office, into a mathematics course above Math 210.
	MATH202_SLO_1	Place, via test at Placement Office, into a mathematics course above Math 212.
	MATH203_SLO_1	Place, via test at Placement Office, into a mathematics course above Math 114.
	MATH210_SLO_1	Demonstrate and apply a systematic and logical approach to solving arithmetic and geometric problems.
	MATH210_SLO_2	Demonstrate and apply the knowledge and skills required to select the correct introductory formulas, procedures, and concepts from algebra and geometry and use them to solve problems.

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	MATH212_SLO_1	Evaluate real-world situations and distinguish between and apply linear and quadratic function models appropriately.
	MATH212_SLO_2	Analyze, interpret, and communicate results of linear and quadratic models in a logical manner from four points of view - visual, formula, numerical, and written.
	MATH212_SLO_3	Demonstrate an appreciation and awareness of applications in their daily lives.
	MATH217_SLO_1	Organize, analyze, and utilize appropriate methods to draw conclusions based on sample data by constructing and/or evaluating tables, graphs, and numerical measures of characteristics of data.
	MATH217_SLO_2	Analyze and describe data distributions through the study of probability theory.
	MATH217_SLO_3	Evaluate real-world situations and apply linear, quadratic and exponential function models appropriately.
	MATH22_SLO_1	Critique a mathematical statement for its truth value, defend choice by formulating a mathematical proof or constructing a counterexample.
	MATH22_SLO_2	Analyze and apply patterns of discrete mathematical structures to demonstrate mathematical thinking.
	MATH23_SLO_1	Organize, analyze, and utilize appropriate methods to draw conclusions based on sample data by constructing and/or evaluating tables, graphs, and numerical measures of characteristics of data.
	MATH23_SLO_2	Use calculus based mathematics to construct, analyze, apply, and simulate probability and sampling distributions in theory and applications, and to justify appropriate statistical analyses and inferential methods.
	MATH23_SLO_3	Collect data, interpret, compose and defend conjectures, and communicate the results of random data using statistical analyses such as interval and point estimates, hypothesis tests, and regression analysis.
	MATH241_SLO_1	Analyze and develop linear, polynomial, exponential, logarithmic and implicit function models.
	MATH241_SLO_2	Communicate concepts and solutions for problems both verbally and in writing.
	MATH242_SLO_1	Analyze and develop trigonometric models.
	MATH242_SLO_2	Communicate concepts and solutions for problems both verbally and in writing.
	MATH243_SLO_1	Analyze and develop trigonometric, matrix, and discrete models for problems within two- and three- dimensional Cartesian or polar coordinate systems.
	MATH243_SLO_2	Communicate concepts and solutions for problems both verbally and in writing.
	MATH2A_SLO_1	Construct and evaluate differential equation models to solve application problems.
	MATH2A_SLO_2	Classify, solve and analyze differential equation problems by applying appropriate techniques and theory.
	MATH2B_SLO_1	Construct and evaluate linear systems/models to solve application problems.
	MATH2B_SLO_2	Solve problems by deciding upon and applying appropriate algorithms/concepts from linear algebra.
	MATH2B_SLO_3	Apply theoretical principles of linear algebra to define properties of linear transformations, matrices and vector spaces.
	MATH41_SLO_1	Investigate, evaluate, and differentiate between algebraic and transcendental functions in their graphic, formulaic, and tabular representations.
	MATH41_SLO_2	Synthesize, model, and communicate real-life applications and phenomena using algebraic and transcendental functions.
	MATH42_SLO_1	Formulate, construct, and evaluate trigonometric models to analyze periodic phenomena, identities, and geometric applications.

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	MATH43_SLO_1	Analyze, investigate, and evaluate linear systems, vectors, and matrices related to two or three dimensional geometric objects.
	MATH43_SLO_2	Graph and analyze regions/curves represented by inequalities or trigonometric, polar, and parametric equations, including conic sections.
	MATH43_SLO_3	Analyze, develop, and evaluate formulas for sequences and series; Justify those formulas by mathematical induction.
	MATH44_SLO_1	Analyze contemporary mathematical problems, apply problem solving techniques using a variety of methods, and communicate the results mathematically through a variety of forms.
	MATH44_SLO_2	Demonstrate and correctly apply basic mathematical techniques in at least five of the following ten areas: symmetry, graph theory, fractals and chaos theory, topology, number theory, geometry, combinatorics, methods of social choice, probability and statistics, economics and personal finance.
	MATH44_SLO_3	Examine and evaluate myths and realities about the contemporary discipline of mathematics and its practitioners.
	MATH46_SLO_1	Analyze mathematical problems from elementary mathematics, apply problem solving techniques using a variety of methods, solve these problems individually and in groups, and communicate results mathematically through a variety of forms.
	MATH46_SLO_2	Utilize ideas from number theory, distinguish types and properties of numbers, and employ mathematical rules for operating on rational and irrational numbers using verbal, symbolic, geometric, and numerical methods.
	MATH46_SLO_3	Examine and evaluate myths and realities about the contemporary discipline of mathematics and its practitioners.
	MATH46_SLO_4	Identify and discuss developments in the history of elementary mathematics from a variety of cultures.
	MATH77_SLO_1	Investigate an area of special interest and demonstrate an appropriate level of understanding and expertise.
Dept - (PSME) Meteorology	MET10_SLO_1	Analyze and explain the objective techniques used by synoptic meteorologists and climatologists to forecast our planet's weather and to predict future changes in our planet's climate. .
	MET10_SLO_2	Assess and critique the impact of meteorology and climatology as sciences on local, national and international economic, environmental, ethical and political issues including climate change.
Dept - (PSME) Physics	PHYS10_SLO_1	Critically examine new, previously un-encountered problems, analyzing and evaluating their constituent parts, to construct and explain a logical solution utilizing, and based upon, the fundamental laws of physics in general.
	PHYS2A_SLO_1	Critically examine new, previously un-encountered problems, analyzing and evaluating their constituent parts, to construct and explain a logical solution utilizing, and based upon, the fundamental laws of mechanics
	PHYS2A_SLO_2	Gain confidence in taking precise and accurate scientific measurements, with their uncertainties, and then with calculations from them, analyze their meaning as relative, in an experimental context, to the verification and support of physics theories.
	PHYS2B_SLO_1	Critically examine new, previously un-encountered problems, analyzing and evaluating their constituent parts, to construct and explain a logical solution utilizing, and based upon, the fundamental laws of electricity and magnetism.
	PHYS2B_SLO_2	Gain confidence in taking precise and accurate scientific measurements, with their uncertainties, and then with calculations from them, analyze their meaning as relative, in an experimental context, to the verification and support of physics theories.
	PHYS2C_SLO_1	Critically examine new, previously un-encountered problems, analyzing and evaluating their constituent parts, to construct and explain a logical solution utilizing, and based upon, the fundamental laws of optics, thermodynamics,

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	PHYS2C_SLO_1	fluids, and modern physics.
	PHYS2C_SLO_2	Gain confidence in taking precise and accurate scientific measurements, with their uncertainties, and then with calculations from them, analyze their meaning as relative, in an experimental context, to the verification and support of physics theories.
	PHYS4A_SLO_1	Critically examine new, previously un-encountered problems, analyzing and evaluating their constituent parts, to construct and explain a logical solution utilizing, and based upon, the fundamental laws of mechanics.
	PHYS4A_SLO_2	Gain confidence in taking precise and accurate scientific measurements, with their uncertainties, and then with calculations from them, analyze their meaning as relative, in an experimental context, to the verification and support of physics theories.
	PHYS4B_SLO_1	Critically examine new, previously un-encountered problems, analyzing and evaluating their constituent parts, to construct and explain a logical solution utilizing, and based upon, the fundamental laws of electricity and magnetism.
	PHYS4B_SLO_2	Gain confidence in taking precise and accurate scientific measurements, with their uncertainties, and then with calculations from them, analyze their meaning as relative, in an experimental context, to the verification and support of physics theories.
	PHYS4C_SLO_1	Critically examine new, previously un-encountered problems, analyzing and evaluating their constituent parts, to construct and explain a logical solution utilizing, and based upon, the fundamental laws of waves, fluids, optics, and thermodynamics.
	PHYS4C_SLO_2	Gain confidence in taking precise and accurate scientific measurements, with their uncertainties, and then with calculations from them, analyze their meaning as relative, in an experimental context, to the verification and support of physics theories.
	PHYS4D_SLO_1	Critically examine new, previously un-encountered problems, analyzing and evaluating their constituent parts, to construct and explain a logical solution utilizing, and based upon, the fundamental laws of modern physics.
	PHYS4D_SLO_2	Gain confidence in taking precise and accurate scientific measurements, with their uncertainties, and then with calculations from them, analyze their meaning as relative, in an experimental context, to the verification and support of physics theories.
	PHYS50_SLO_1	Critically examine new, previously un-encountered problems, analyzing and evaluating their constituent parts, to construct and explain a logical solution utilizing, and based upon, the fundamental laws of mechanics