State Competencies: Learning Outcomes Being Measured

Area I: Communications

1. Students will analyze and evaluate oral and written communication in terms of situation, audience, purpose, aesthetics, and diverse points of view.

   Students should:

   Understand, appreciate, and critically evaluate a variety of written and spoken messages in order to make informed decisions.

2. Students will express a primary purpose in a compelling statement and order supporting points logically and convincingly.

   Students should:

   Organize their thinking to express their viewpoints clearly, concisely, and effectively.

3. Students will use effective rhetorical strategies to persuade, inform, and engage.

   Students should:

   Select and use the best means to deliver a particular message to a particular audience. Rhetorical strategies include but are not limited to modes (such as narration, description, and persuasion), genres (essays, web pages, reports, proposals), media and technology (PowerPointTM, electronic writing), and graphics (charts, diagrams, formats).

4. Students will employ writing and/or speaking processes such as planning, collaborating, organizing, composing, revising, and editing to create presentations using correct diction, syntax, grammar, and mechanics.

   Students should:

   Use standard processes for generating documents or oral presentations independently and in groups.

5. Students will integrate research correctly and ethically from credible sources to support the primary purpose of a communication.

   Students should:

   Gather legitimate information to support ideas without plagiarizing, misinforming or distorting.

6. Students will engage in reasoned civic discourse while recognizing the distinctions among opinions, facts, and inferences.

   Students should:
Area II: Mathematics

Algebra

1. **Students will graph functions**

Students should:

a. Sketch the graphs of linear, higher-order polynomial, rational, absolute value, exponential, logarithmic, and radical functions.

b. Sketch a graph using point plotting and analysis techniques, including basic transformations of functions such as horizontal and vertical shifts, reflections, stretches, and compressions.

c. Determine the vertex, axis of symmetry, maximum or minimum, and intercepts of a quadratic equation.

2. **Students will solve various kinds of equations.**

Students should:

a. Solve quadratic equations using factoring, completing the squares, the square root method, and quadratic formula.

b. Solve exponential and logarithmic equations.

c. Solve systems of two or three linear equations.

3. **Students will demonstrate the use of function notation and perform operations on functions.**

Students should:

a. Find the value of a function for a given domain value

b. Add, subtract, multiply, divide and compose functions.

c. Determine the inverse of a function.

d. Compute the difference quotient for a function.

e. Correctly use function notation and vocabulary related to functions, i.e. domain, range, independent variable, of, even symmetry, etc.

4. **Students will model/solve real-world problems.**

Students should:

a. Use and understand slope as a rate of change.
b. Use equations and systems of equations to solve application problems.
c. Apply knowledge of functions to solve specific application problems.
d. Solve compound interest problems.
e. Solve application problems involving maximization or minimization of a quadratic function.
f. Solve exponential growth and decay problems.

Calculus I

1. **Students will demonstrate an understanding of the theoretical, geometrical underpinnings of the calculus.**

   Students should:
   Algebraically and graphically demonstrate an understanding of:
   a. Limit
   b. Tangent line
   c. Difference quotient
   d. Fundamental theorem of calculus
   e. Riemann sums

2. **Students will use concepts of function, limit, continuity, derivative, and integral.**

   Students should:
   Apply the theory of calculus through manipulations involving:
   a. The finding of limits.
   b. Using differentiation techniques.
   c. Working with transcendental & trigonometric functions.
   d. Determining points of discontinuity and intervals of continuity.

3. **Students will apply methods of calculus to optimization, graphing, and approximation.**

   Students should be able to:
   a. Find extreme points.
   b. Understand the graphs of a function and its 1st and 2nd derivatives and how they relate.
   c. Apply Newton’s method.
d. Use differentials to approximate functions.

4. Students will apply differential and integral calculus to problems in geometry, physics, and other fields.

Students should:

a. Understand that calculus has many uses in science, business, and other fields.

b. Students should be able to solve application problems involving rates of change, optimization, related rates, and acceleration/velocity.

Other College-Level Math Courses

1. Students will display, analyze, and interpret data.

Students should:

a. Discriminate among different types of data displays for the most effective presentation.

b. Draw conclusions from the data presented.

c. Analyze the implication of the conclusion to real life situations.

2. Students will demonstrate knowledge of problem-solving strategies.

Students should:

a. For a given problem, gather and organize relevant information.

b. Choose an effective strategy to solve the problem.

c. Express and reflect on the reasonableness of the solution to the problem.

3. Students will construct valid mathematical explanations.

Students should:

Use mathematics to model and explain real life problems.

4. Students will display an understanding of the development of mathematics.

Students should:

Recognize that math has evolved over centuries and that our current body of knowledge has been built upon contributions of many people and cultures over time.

5. Students will demonstrate an appreciation for the extent, application, and beauty of mathematics.

Students should:
Recognize the inherent value of mathematical concepts, their connection to structures in nature, and their implications for everyday life.

Area III: Laboratory Science

1. **Students will describe the process of scientific inquiry.**

   Students should:
   
a. Understand that scientists rely on evidence obtained from observations rather than authority, tradition, doctrine, or intuition.

   b. Students should value science as a way to develop reliable knowledge about the world.

2. **Students will solve problems scientifically.**

   Students should:
   
a. Be able to construct and test hypotheses using modern lab equipment (such as microscopes, scales, computer technology) and appropriate quantitative methods.

   b. Be able to evaluate isolated observations about the physical universe and relate them to hierarchically organized explanatory frameworks (theories).

3. **Students will communicate scientific information.**

   Students should:

   Communicate effectively about science (e.g., write lab reports in standard format and explain basic scientific concepts, procedures, and results using written, oral, and graphic presentation techniques.)

4. **Students will apply quantitative analysis to scientific problems.**

   Students should:
   
a. Select and perform appropriate quantitative analyses of scientific observations.

   b. Show familiarity with the metric system, use a calculator to perform appropriate mathematical operations, and present results in tables and graphs.

5. **Students will apply scientific thinking to real world problems.**

   Students should:
   
a. Critically evaluate scientific reports or accounts presented in the popular media.

   b. Understand the basic scientific facts related to important contemporary issues (e.g., global warming, stem cell research, cosmology), and ask informed questions about those issues.
Area IV: Social/Behavioral Sciences

1. Students will identify, describe and explain human behaviors and how they are influenced by social structures, institutions, and processes within the contexts of complex and diverse communities.

Students should:

Develop an understanding of self and the world by examining content and processes used by social and behavioral sciences to discover, describe, explain, and predict human behaviors and social systems.

2. Students will articulate how beliefs, assumptions, and values are influenced by factors such as politics, geography, economics, culture, biology, history, and social institutions.

Students should:

Enhance knowledge of social and cultural institutions and the values of their society and other societies and cultures in the world.

3. Students will describe ongoing reciprocal interactions among self, society, and the environment.

Students should:

Understand the interdependent nature of the individual, family/social group, and society in shaping human behavior and determining quality of life.

4. Students will apply the knowledge base of the social and behavioral sciences to identify, describe, explain, and critically evaluate relevant issues, ethical dilemmas, and arguments.

Students should:

Articulate their role in a global context and develop an awareness and appreciation for diverse value systems in order to understand how to be good citizens who can critically examine and work toward quality of life within a framework of understanding and justice.

Area V: Humanities and Fine Arts

1. Students will analyze and critically interpret significant and primary texts and/or works of art (this includes fine art, literature, music, theatre, and film.)

2. Students will compare art forms, modes of thought and expression, and processes across a range of historical periods and/or structures (such as political, geographic, economic, social, cultural, religious, and intellectual).
3. **Students will recognize and articulate the diversity of human experience across a range of historical periods and/or cultural perspectives.**

4. **Students will draw on historical and/or cultural perspectives to evaluate any or all of the following: contemporary problems/issues, contemporary modes of expression, and contemporary thought.**

For all Humanities and Fine Arts Competencies, students should:

Possess an understanding of the present that is informed by an awareness of past heritages in human history, arts, philosophy, religion, and literature, including the complex and interdependent relationships among cultures.

Note: For the purposes of the Humanities and Fine Arts requirement, courses will come from the areas of History, Philosophy, Literature, Art, Dance, Music, Theatre and those offerings from other disciplines that also include, among other criteria, analytical study of primary texts and/or works of art as forms of cultural and creative expression. This requirement does not include work in areas such as studio and performance courses or courses that are primarily skills-oriented. The requirements must be fulfilled by courses from two different disciplines.