***Procedural and Logical Thinking***

**Definition**

Procedural and Logical Thinking is the process of designing, evaluating and/or implementing a logical, sequential strategy to answer an open-ended question or achieve a desired goal (modified from the AAC&U Problem Solving rubric).

**Rationale and Intent**

Courses addressing problem solving within the LAS curriculum teach a variety of interrelated but distinct skills, including quantitative reasoning, scientific inquiry and analysis, and constructing and analyzing logical arguments to generate a solution; we identify this latter skill as Procedural and Logical Thinking. A subset of Procedural and Logical Thinking is computational thinking. Decomposing problems or tasks into smaller parts, pattern recognition, modeling, and developing sequential steps for solving a problem or answering a question can constitute computational thinking, according to the International Society for Technology in Education (ISTE) and Computer Science Teachers Association (CSTA). While computational thinking is essential to the development of computer applications, it can also be used to support problem solving across all disciplines, including the humanities, mathematics, and science. Disciplines including, but not limited to, computer science, engineering, logic, mathematics, and the natural, physical, and behavioral sciences, all include coursework that focuses on preparing students to better engage in Procedural and Logical Thinking.

**Goal**

Fitchburg State University students will use a rational, systematic procedure to arrive at conclusions, examine or build underlying patterns and structures, or deduce further information.

**Potential Course Objectives**

The objectives below are recommended as models for general education course syllabi. The list is not meant to be complete. Faculty should feel free to adopt these as course objectives, or they may develop their own.

* Predict and explain the outcomes of a sequence of instructions
* Create and modify a sequence of instructions that provide a solution to a given task
* Develop and follow strategies to minimize committing common fallacies in thinking that impair accurate conclusions and predictions (e.g., confirmation bias, post hoc explanations, implying causation from correlation)
* Break down a complex task into small, meaningful parts
* Combine a sequence of instructions to follow a pattern
* Recognize and find patterns or trends
* Generalize and transfer a problem-solving process to a wide variety of tasks
* Ignore detail that is not of interest, simplifying a complex task
* Represent data through abstractions such as models and simulations
* Analyze a procedural solution to a task and formulate a more efficient process
* Identify and correct errors in a sequence of instructions to analyze a solution and formulate a more efficient solution
* Apply existing data analysis tools to extract information