GT PATHWAYS COMPETENCY: QUANTITATIVE LITERACY

Required in GT Pathways Categories:

- GT-MA1 (SLOs 1, 2, 3 & 4 and 5 for Statistics courses)
- GT- SC1 (SLOs 1 & 2)
- GT-SC2 (SLOs 1 & 2)

Criteria for Quantitative Literacy

Competency in quantitative literacy represents a student's ability to use quantifiable information and mathematical analysis to make connections and draw conclusions. Students with strong quantitative literacy skills understand and can create sophisticated arguments supported by quantitative evidence and can clearly communicate those arguments in a variety of formats (using words, tables, graphs, mathematical equations, etc.).

Student Learning Outcomes (SLOs)

Students should be able to:

1. Interpret Information (required for GT-MA1, GT-SC1 & GT-SC2)
   a. Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).

2. Represent Information (required for GT-MA1, GT-SC1 & GT-SC2)
   a. Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).

3. Perform Calculations (required for GT-MA1)
   a. Solve problems or equations at the appropriate course level.
   b. Use appropriate mathematical notation.
   c. Solve a variety of different problem types that involve a multi-step solution and address the validity of the results.

4. Apply and Analyze Information (required for GT-MA1)
   a. Make use of graphical objects (such as graphs of equations in two or three variables, histograms, scatterplots of bivariate data, geometrical figures, etc.) to supplement a solution to a typical problem at the appropriate level.

b. Formulate, organize, and articulate solutions to theoretical and application problems at the appropriate course level.
c. Make judgments based on mathematical analysis appropriate to the course level.

5. Communicate Using Mathematical Forms (required for GT-MA1)

a. Express mathematical analysis symbolically, graphically, and in written language that clarifies/justifies/summarizes reasoning (may also include oral communication).

6. Address Assumptions (required of statistics courses only)

a. Describe and support assumptions in estimation, modeling, and data analysis, used as appropriate for the course.

QUANTITATIVE LITERACY RUBRIC

*This rubric is meant to be an **optional** course design and assessment tool. Evaluators are encouraged to assign a zero to any work sample or collection of work that does not meet level one performance criteria minimum.*

	4	3	2	1
Interpret Information	Provides accurate explanations of information presented in mathematical forms. Makes appropriate inferences based on that information.	Provides accurate explanations of information presented in mathematical forms.	Provides explanations of information presented in mathematical forms, but makes errors within the explanation or inappropriate inferences based on the information.	Attempts to explain information presented in mathematical forms, but draws incorrect conclusions about what the information means.
Represent Information	Skillfully converts relevant information into an insightful mathematical portrayal in a way that contributes to a further or deeper understanding.	Competently converts relevant information into an appropriate and desired mathematical portrayal.	Completes conversion of information but resulting mathematical portrayal is only partially appropriate ***or*** accurate.	Completes conversion of information but resulting mathematical portrayal is inappropriate ***or*** inaccurate.
Perform Calculations	Calculations attempted are all successful and sufficiently comprehensive to solve the problem. Calculations are also presented elegantly (clearly, concisely, etc.) and address the validity of the results.	Calculations attempted are essentially all successful and sufficiently comprehensive to solve the problem. Calculations are also presented cohesively and address the validity of the results.	Calculations attempted are successful but only represent a portion of the calculations required to comprehensively solve the problem.	Calculations are attempted but are unsuccessful and may not be comprehensive.

	4	3	2	1
Apply and Analyze Information	Uses quantitative analysis as the basis for deep and thoughtful judgments, drawing insightful, carefully qualified conclusions from this work.	Uses quantitative analysis as the basis for competent judgments, drawing reasonable and appropriately qualified conclusions from this work.	Uses quantitative analysis as the basis for tentative, basic judgments, drawing plausible conclusions from this work.	Uses quantitative analysis as the basis for unskilled judgments, is hesitant or uncertain about drawing conclusions from this work.
Communicate Using Mathematical Forms	Uses quantifiable information in connection with a written argument or description of purpose of the work, presents it in an effective format, and explains with consistently high quality (may also include an oral argument).	Uses quantifiable information in connection with a written argument or description of purpose of the work, though data may be presented in a less than complete format or some parts of the explanation may be disjointed.	Presents a written argument but does not provide adequate quantifiable information to support or connect the argument and purpose of work.	Uses quantifiable information, but does not articulate a written argument that connects to the purpose of the work and the information.
Address Assumptions **(Required of statistics courses only)**	Specifically describes assumptions and provides compelling rationale for why each assumption is appropriate. Shows awareness that confidence in final conclusions is limited by the accuracy of the assumptions.	Specifically describes assumptions and provides compelling rationale for why assumptions are appropriate.	Specifically describes assumptions but attempts made to address rationale are inappropriate or ineffective.	Specifically describes assumptions but lacks rationale.

This rubric was adapted from the Association of American Colleges and Universities (AAC&U) VALUE rubrics and is also aligned with the Interstate Passport Initiative Learning Outcomes. The original VALUE rubrics may be accessed at http://www.aacu.org/value-rubrics. The Interstate Passport Initiative Learning Outcomes can be accessed at http://www.wiche.edu/passport/learningOutcomesCriteria.