

Texas A&M International University

Empirical and Quantitative Skills Rubric*

The 2014 Core Curriculum Texas A&M International University Detailed Description of Point Assessment

Point Value		Brief Explanation
4	<p>An artifact scoring a <u>5</u> demonstrates the following:</p> <ul style="list-style-type: none"> • Identification: The purpose, components, and variables of the investigation/project are completely identified. • Analysis: All investigative or quantitative components are methodically scrutinized. The steps followed are logical and relevant to the desired result. Appropriate tools/technology were used and well integrated into the final product. Notations are consistent and well defined together with in-depth step-by-step analysis of the problem in hand/or presented. • Integration: The information that is required for an analysis of all investigative components is agreeably evident. If applicable, all values are correctly translated into variables and all necessary formulas are present. • Presentation: A concise summary of the analysis is presented. The presented information is correct, of high quality, and the terminology/figures are accurate and easy to understand. All visual representations of evidence are well-scaled and well represent the analysis findings. • Application: The coherent integration of all steps of the investigation lead to an accurate, complete, relevant conclusion related to the initial investigative statement. • Evaluation: The extent to which conscious value judgments are utilized at appropriate level by students. 	Exemplary
3	<p>An artifact scoring a <u>4</u> demonstrates the following:</p> <ul style="list-style-type: none"> • Identification: The purpose, components, and variables of the investigation/project are mostly identified. • Analysis: All investigative or quantitative components are scrutinized. The steps followed are logical and relevant to the desired result. Appropriate tools/technology were used and mostly integrated into the final product. Notations are consistent and well defined. • Integration: The information that is required for an analysis of all investigative components is mostly evident. If applicable, most values are correctly translated into variables and all necessary formulas are present. • Presentation: A good summary of the analysis is presented. The presented information is correct, of good quality, and the terminology/figures are accurate and easy to understand. Most visual representations of evidence are well-scaled and well represent the analysis findings. • Application: The coherent integration of all steps of the investigation lead to an accurate, mostly complete, relevant conclusion that is relative to the initial investigative statement. • Evaluation: The extent to which conscious value judgments are utilized at appropriate level by students. 	Accomplished
2	<p>An artifact scoring a <u>3</u> demonstrates the following :</p> <ul style="list-style-type: none"> • Identification: The purpose, components, and variables of the investigation/project are somewhat identified. • Analysis: All investigative or quantitative components are somewhat scrutinized. The steps followed are mostly logical and relevant to the desired result. Appropriate tools/ technology were mostly used and somewhat integrated into the final product. Notations are mostly consistent and defined. • Integration: The information that is required for an analysis of all investigative components is somewhat evident. If applicable, some values are correctly translated into variables and most necessary formulas are present. • Presentation: A summary of the analysis is presented. The presented information is correct, of good quality, and the terminology/figures are mostly accurate and easy to understand. Most visual representations of evidence are acceptably scaled and represent the analysis findings. • Application: The integration of most steps of the investigation lead to an accurate, mostly complete, acceptable conclusion that is relative to the initial investigative statement. • Evaluation: The extent to which conscious value judgments are utilized at appropriate level by students. 	Competent
1	<p>An artifact scoring a <u>2</u> demonstrates the following:</p> <ul style="list-style-type: none"> • Identification: The purpose, components, and variables of the investigation/project are not fully identified. • Analysis: Some investigative or quantitative components are scrutinized. Some steps followed are somewhat logical and relevant to the desired result. Appropriate tools/ 	Beginning

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	<p>technology were somewhat used but not integrated into the final product. Notations are not consistent and/or defined.</p> <ul style="list-style-type: none"> • Integration: The information that is required for an analysis of all investigative components is not fully evident. If applicable, some values are correctly translated into variables and some necessary formulas are present. • Presentation: A partial summary of the analysis is presented. The presented information is somewhat correct, of adequate quality, and the terminology/figures are somewhat accurate and relatively easy to understand. Some visual representations of evidence are acceptably scaled and represent the analysis findings. • Application: The integration of most steps of the investigation lead to a somewhat accurate, partially complete conclusion that is relative to the initial investigative statement. • Evaluation: The extent to which conscious value judgments are utilized at appropriate level by students. 	
0	<p>An artifact scoring a <u>1</u> demonstrates the following:</p> <ul style="list-style-type: none"> • Identification: The purpose, components, and variables of the investigation/project are not identified. • Analysis: Most investigative or quantitative components are not scrutinized. The steps followed are illogical and/or irrelevant to the desired result. Appropriate tools/technology were not used and/or integrated into the final product. Notations are not consistent and/or not defined. • Integration: The information that is required for an analysis of all investigative components is not evident. If applicable, values are incorrectly translated into variables and no necessary formulas are present. • Presentation: A summary of the analysis is either inadequately presented or not presented at all. The presented information is mostly incorrect, and/or of poor quality, and/or the terminology/figures are inaccurate and /or hard to understand. Few or no visual representations of evidence are acceptable scaled/ represent the analysis findings. • Application: The integration does not include all steps of the investigation and does not lead to an accurate, nor complete conclusion that relates to the initial investigative argument. • Evaluation: The extent to which conscious value judgments are utilized at appropriate level by students. 	Deficient

*This rubric was derived from LEAP Value Rubrics.

This rubric was mostly adopted from the one created by Amarillo College, TX and Empirical and Quantitative Skills Rubric from the Association of American Colleges and Universities (AAC&U)

EMPIRICAL AND QUANTITATIVE SKILLS COMPETENCIES

Competency Statement: Students will be able to demonstrate the ability to formulate a scientifically and/or mathematically sound inquiry, and then identify and follow an investigative process using empirical and/or quantitative reasoning to respond to the inquiry.

Operational Definition: Upon completion of this course, in the student's degree plan at Texas A&M International University, students will be able to apply and analyze scientific and/or mathematical concepts and will be able to arrive at reasonable conclusions based on the analysis of gathered information and collected data.

Benchmark: 70% of all artifacts will receive a score of 3 or higher on a scale of 1-5.

Description of Assignments (Artifacts of Student Work): Assignments, reports, or projects to be assessed include work from any discipline where scientific and/or mathematical analysis may be required. Empirical skills must address the thinking process as it is demonstrated: (a) through observation, experimentation, and/or experience; and (b) through quantitative data and/or qualitative reasoning. Quantitative skills will allow students to demonstrate their knowledge through quantitative data and/or qualitative reasoning. Qualitative skills will allow students to demonstrate their higher-order thinking capabilities through the use of applied mathematics and/or mathematics assignments that have a purpose beyond merely providing the valid answer to a set of mathematical problems.

Possible assignments include, but are not limited to: case studies, critiquing research articles, drafting reports, performing laboratory assignments, analyzing or creating graphs and tables related to statistical data, or any project summaries that uses applied mathematics (e.g. nursing, engineering, mathematics, psychology, biology, and sociology, etc.).

Definitions of Concepts

1. **Identification** – The extent to which the identification of the problem is done with in-depth knowledge and analysis, the understanding of the nature of the inquiry, and the desired outcome(s) of analysis as indicated. Identification clearly pinpoints what information is being sought and what types of analysis and synthesis are required.
2. **Analysis** – The extent to which the rationale and relevance of the analytical steps taken and methods applied toward achieving the desired outcomes, the logic and clarity within the presented methods, and the accuracy (for validity) and precision (for reliability) of the information is presented.
3. **Integration** – The extent to which the information required for analysis is integrated, measured, and identified. Integration reflects whether all necessary information is presented and used, whether the organization is logical, and whether any outside information should be discussed relevant to the current assignment.
4. **Presentation** – The extent at which a clear conclusion and/or supplemental materials (e. g. graphs, charts, formulas, pictures, etc.) are presented, and thereby, students will be able to

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exhibit complete comprehension, adequate understanding, and complete evaluation of the topic(s) presented.

5. **Application** – The extent to which the results of analysis are applied/utilized to respond or address the hypothesis or problem statement.
6. **Evaluation** – The extent to which conscious value judgments are utilized at appropriate level by students.