Chemistry Department Assessment of Core Competencies:
Oral Communication and Quantitative Reasoning

Learning Outcome: Students will develop oral communication and quantitative reasoning skills.

Outcome Measure: Chemistry Research Study Presentation in Chemistry Seminar (CHE495).

Criteria for Success: At least 80% of students will have an average score of 3 or higher.

Longitudinal Data:

% students with average score of 3.0 or higher	2015, n=10
Oral Communication	100%
Quantitative Reasoning	100%

Conclusions Drawn from Data: Students are successful in oral communication and quantitative reasoning.

Changes to be Made Based on Data: No changes are necessary.

Rubric Used: See below.

Chemistry Department Assessment of Core Competencies:
Written Communication, Information Literacy, and Critical Thinking

Learning Outcome: Students will develop written communication, information literacy, and critical thinking skills.

Outcome Measure: Chemistry Ethics Paper in Chemistry Seminar (CHE495).

Criteria for Success (if applicable): At least 80% of students will have an average score of 3 or higher.

Longitudinal Data:

% students with average score of 3.0 or higher	2015, n=10
Written Communication	80%
Information Literacy	80%
Critical Thinking Skills	60%

Conclusions Drawn from Data: The criteria for success were met for written communication and information literacy, but not critical thinking skills. This was the first year the core competencies were assessed in this course using these assignments. It is difficult to make conclusions without longitudinal data over a few years.

Changes to be Made Based on Data: We will keep an eye on the performance in critical thinking skills in future years to determine if critical thinking skills need to be further developed in this course.

Rubric Used: See below.

CHEM 495 Rubric (Oral Communication and Quantitative Literacy)

	Outstanding - 4	High satisfactory - 3	Low satisfactory - 2	Unsatisfactory - 1
Command of background material	• Clearly knows material and key facts by memory • Expands on PPT slides • Content and language appropriate for audience	• Clearly knows key facts with a few memory slips • Some expansion on PPT slides • Partial audience adaptation of content	• Read some information; knows some facts from memory • No expansion on PPT slide content • little audience adaptation of content	• Read sentence from slides • Dependent on notes • Lack audience adaptation of content
Organization	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable and is skillful and makes the content of the presentation cohesive.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is clearly and consistently observable within the presentation	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is intermittently observable within the presentation.	Organizational pattern (specific introduction and conclusion, sequenced material within the body, and transitions) is not observable within the presentation.
Delivery	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.
Interpretation *Ability to explain information presented in mathematical forms*	Provides accurate explanations of information presented in mathematical forms. Makes appropriate inferences based on that information. For example, accurately explains the	Provides accurate explanations of information presented in mathematical forms. For instance, accurately explains the trend data	Provides somewhat accurate explanations of information presented in mathematical forms, but occasionally makes minor errors related to	Attempts to explain information presented in mathematical forms, but draws incorrect conclusions about what the information means. For example, attempts to explain the trend data shown in

	trend data shown in a graph and makes reasonable predictions regarding what the data suggest about future events.	shown in a graph.	computations or units.	a graph, but will frequently misinterpret the nature of that trend, perhaps by confusing positive and negative trends.
Application / Analysis *Ability to make judgments and draw appropriate conclusions based on the quantitative analysis of data, while recognizing the limits of this analysis*	Uses the quantitative analysis of data as the basis for deep and thoughtful judgments, drawing insightful, carefully qualified conclusions from this work.	Uses the quantitative analysis of data as the basis for competent judgments, drawing reasonable and appropriately qualified conclusions from this work.	Uses the quantitative analysis of data as the basis for workmanlike (without inspiration or nuance, ordinary) judgments, drawing plausible conclusions from this work.	Uses the quantitative analysis of data as the basis for tentative, basic judgments, although is hesitant or uncertain about drawing conclusions from this work.
Communication *Expressing quantitative evidence in support of the argument or purpose of the work (in terms of what evidence is used and how it is formatted, presented, and contextualized)*	Uses quantitative information in connection with the argument or purpose of the work, presents it in an effective format, and explicates it with consistently high quality.	Uses quantitative information in connection with the argument or purpose of the work, though data may be presented in a less than completely effective format or some parts of the explication may be uneven.	Uses quantitative information, but does not effectively connect it to the argument or purpose of the work.	Presents an argument for which quantitative evidence is pertinent, but does not provide adequate explicit numerical support. (May use quasi-quantitative words such as "many," "few," "increasing," "small," and the like in place of actual quantities.)

CHEM 495 Rubric (Written Communication, Critical Thinking and Information Literacy)

	Outstanding - 4	High satisfactory - 3	Low satisfactory - 2	Unsatisfactory - 1
Content Development	Uses appropriate, relevant, and compelling content to illustrate mastery of the subject, conveying the writer's understanding, and shaping the whole work.	Uses appropriate, relevant, and compelling content to explore ideas within the context of the discipline and shape the whole work.	Uses appropriate and relevant content to develop and explore ideas through most of the work.	Uses appropriate and relevant content to develop simple ideas in some parts of the work.
Control of Syntax and Mechanics	Uses graceful language that skillfully communicates meaning to readers with clarity and fluency, and is virtually error-free.	Uses straightforward language that generally conveys meaning to readers. The language in the portfolio has few errors.	Uses language that generally conveys meaning to readers with clarity, although writing may include some errors.	Uses language that sometimes impedes meaning because of errors in usage
Explanation of issues	Issue/problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/or backgrounds unknown.	Issue/problem to be considered critically is stated without clarification or description
Student's position (perspective, thesis/ hypothesis)	Specific position (perspective, thesis/hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/hypothesis) are acknowledged. Others' points of view are	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position	Specific position (perspective, thesis/hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/hypothesis) is stated, but is simplistic and obvious.

	synthesized within position (perspective, thesis/hypothesis).	(perspective, thesis/hypothesis).		
Use Information Effectively to Accomplish a specific purpose	Communicates, organizes and synthesizes information from sources to fully achieve a specific purpose, with clarity and depth	Communicates, organizes and synthesizes information from sources. Intended purpose is achieved.	Communicates and organizes information from sources. The information is not yet synthesized, so the intended purpose is not fully achieved.	Communicates information from sources. The information is fragmented and/or used inappropriately (misquoted, taken out of context, or incorrectly paraphrased, etc.), so the intended purpose is not achieved.
Determine the Extent of Information	Effectively defines the scope of the research question or thesis. Effectively determines key concepts. Types of information (sources) selected directly relate to concepts or answer research question.	Defines the scope of the research question or thesis completely. Can determine key concepts. Types of information (sources) selected relate to concepts or answer research question.	Defines the scope of the research question or thesis incompletely (parts are missing, remains too broad or too narrow, etc.). Can determine key concepts. Types of information (sources) selected partially relate to concepts or answer research question.	Has difficulty defining the scope of the research question or thesis. Has difficulty determining key concepts. Types of information (sources) selected do not relate to concepts or answer research question.