

December 19, 2016

Communication Literacy (CL) implementation plan for the BS and BA degrees in Geosciences, including Geology and Geophysics concentrations. This plan will also apply to the Hydrogeology concentration when it becomes official in Fall, 2017.

Learning Outcomes.

Geoscience graduates are expected to be able to communicate with their peers and with the general public in a variety of ways. In particular, they should be capable of:

- 1) Written communication in a scientific format.
- 2) Oral communication, both to peers and to informed laypersons.
- 3) Illustration of data and concepts through various graphical formats.

Expected learning outcomes are organized around each of the expected modes of communication, as follows:

Written communication. Students will have the ability to:

- State a scientific problem.
- Distinguish data from interpretation.
- Reach and support conclusions.

Oral communication. Students will have the ability to:

- Clearly and succinctly present research results to an audience of peers using internationally-accepted styles.
- Where appropriate, effectively present and discuss projected illustrations (e.g., PowerPoint) that may include maps, diagrams, tables, and photographs.

Graphical communication. Students will have the ability to:

- Concisely present data utilizing appropriate illustrations.
- Construct a poster-style presentation that effectively communicates research results.

Communication Literacy courses in the Geosciences BS/BA curriculum.

These courses were chosen because they involve written student products that also require appropriate illustrations, as outlined in the Expected Learning Outcomes. These courses are required of all Bachelors students.

GEOL 3401 Mineralogy and Petrology. Each student prepares a field trip report that involves written and graphical descriptions and written explanations of outcrops examined in the field.

GEOL 3402 Structural Geology. Each student prepares a report based on field mapping. This report involves written description and explanation that must include illustrations (geologic map(s), sketches, and photographs).

GEOL 4101 Undergraduate Seminar. Each student prepares a research proposal focused on the research to be conducted while taking GEOL 4312.

GEOL 4312 Undergraduate Research. Each student prepares a written report and a poster presentation. The latter is presented at the Geosciences Student Research Day, at which time each student is expected to explain his/her research to faculty, student peers, and judges.

Additional courses may be given CL attributes on a one-time basis to accommodate transfer students.

Learning methods.

The following products will be used as part of the learning experience.

- A. Research proposals using internationally-accepted styles [GEOL 4101]
- B. Written, illustrated research reports using internationally-accepted styles [GEOL 3401, 3402, 4312].
- C. A formal poster presentation, to include face-to-face explanations by the student [GEOL 4312].

General expectations in products A to C will be appropriate use of maps, diagrams, data tables, and photographs.

Additional expectations in projects involving development of software will include commented code and formal documentation that provides rationale, algorithmic descriptions, and tutorials [particularly GEOL 4312].

Assessment plan.

Each course with CL attributes requires a specific student product. Assessment of these products will be done by selected faculty members (not course instructors) who will use rubrics to provide standardized scoring. Because of the large numbers of majors in these courses, subsets of the student products will be scored. An example rubric is attached to this document.

In addition, GEOL 4312 requires a student poster presentation of research results. A separate rubric (attached) will be used to assess the poster presentation.

Assessment results will be compiled annually and reported to the faculty. On the basis of similar assessment exercises in previous years, we anticipate that average scores for both individual

assessment criteria and total scores will increase as student cohorts progress through the program, and that the final product (GEOL 4312 report) will yield the highest scores. Following the initial assessments, benchmarks will be set to evaluate changes in the curriculum and how they affect student communication literacy.

Communication Literacy Assessment Rubric for Written Reports

Introduction/Purpose [Learning Outcome 1]

- 4 clearly presented and explained
- 3 given but poorly explained
- 2 vague, not explained
- 1 no introduction/purpose stated

Background (Previous work or Geologic setting) [Learning Outcomes 1 and 2]

- 4 clearly presented and explained
- 3 given but poorly explained
- 2 vague, not explained
- 1 no background provided

Methods [Learning Outcome 1]

- 4 methods clearly explained and errors assessed as appropriate
- 3 methods listed with little explanation; no consideration of errors
- 2 methods listed without explanation or discussion
- 1 methods not presented

Presentation of data [Learning Outcomes 1, 2, and 3]

- 4 thorough and appropriate presentation
- 3 sufficient data, inappropriately presented
- 2 insufficient, poorly presented
- 1 no data presented/illustrated

Discussion [Learning Outcomes 1, 2, and 3]

- 4 clear and accurate analysis integrated with previous work
- 3 accurate analysis poorly integrated with previous work
- 2 incomplete analysis
- 1 inadequate discussion, no analysis

Summary/conclusions [Learning Outcomes 1 and 2]

- 4 results clearly presented, conclusions well supported by analysis & data
- 3 results and conclusions presented, but weakly supported by analysis
- 2 results and conclusions presented, but not supported by analysis
- 1 no results or conclusions

Communication Literacy Assessment Rubric for Poster Presentations

For each category, rank the poster from 4 to 1, with 4 representing complete fulfillment of the objective and 1 representing a lack of fulfillment of the objective.

LO = Learning outcome.

Title: Effectively captures the essence of the presentation. Efficient use of text. Creative.

_____4 _____3 _____2 _____1 LO 3

Introduction: Topic presented clearly and succinctly. Clear context. Reference to previous work.

_____4 _____3 _____2 _____1 LO 1

Objectives: Succinct description of research objective.

_____4 _____3 _____2 _____1 LO 1

Methods: Succinctly written; appropriate; clear.

_____4 _____3 _____2 _____1 LO 1

Results: Data and inference separated. Appropriate, clear graphics.

_____4 _____3 _____2 _____1 LO 1 & 3

Discussion: Integrates data and objectives in research context.

_____4 _____3 _____2 _____1 LO 1 & 3

Conclusions: Succinct summary, data-driven.

_____4 _____3 _____2 _____1 LO 1

Aesthetics & flow: Logical, intuitive presentation; appropriate use of figures and text.

_____4 _____3 _____2 _____1 LO 3

Presenter's explanations of data: Clear, concise, appropriate use of technical terminology.

_____4 _____3 _____2 _____1 LO 2

Presenter's explanations of results: Demonstrates an understanding to results in context of the research objective.

_____4 _____3 _____2 _____1 LO 2

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