2016-2017
Annual Assessment Report Template

For instructions and guidelines visit our **website**
or **contact us** for more help.

Please begin by selecting your program name in the drop down. If the program name is not listed, please enter it below:

BS Geology

OR

Question 1: Program Learning Outcomes

Q1.1.
Which of the following Program Learning Outcomes (PLOs), Sac State Baccalaureate Learning Goals (BLGs), and emboldened Graduate Learning Goals (GLGs) **did you assess?** [**Check all that apply**]

- [x] 1. **Critical Thinking**
- [ ] 2. **Information Literacy**
- [ ] 3. **Written Communication**
- [ ] 4. **Oral Communication**
- [ ] 5. Quantitative Literacy
- [ ] 6. **Inquiry and Analysis**
- [ ] 7. Creative Thinking
- [ ] 8. Reading
- [ ] 9. Team Work
- [x] 10. Problem Solving
- [ ] 11. Civic Knowledge and Engagement
- [ ] 12. **Intercultural Knowledge, Competency, and Perspectives**
- [ ] 13. Ethical Reasoning
- [ ] 14. Foundations and Skills for Lifelong Learning
- [ ] 15. **Global Learning and Perspectives**
- [ ] 16. Integrative and Applied Learning
- [ ] 17. Overall Competencies for GE Knowledge
- [x] 18. **Overall Disciplinary Knowledge**
- [ ] 19. **Professionalism**
- [ ] 20. Other, specify any assessed PLOs not included above:

a.
b.
c.

Q1.2.
Please provide more detailed background information about **EACH PLO** you checked above and other information including how your specific PLOs are **explicitly** linked to the Sac State **BLGs**/**GLGs**:

The Geology Department assessed three Program Learning Outcomes (PLO's) in the 2016/17 academic year.

1. Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems.
2. Students will be proficient in solving geologic problems
3. Students will be proficient in understanding and producing geologic maps

These PLOs are linked to the Sacramento State University Baccalaureate Learning Goals in the following ways:

Program Learning Outcomes	University Baccalaureate Learning Goals
Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems	Competence in the Disciplines Knowledge of Human Cultures and the Physical and Natural World
Students will be proficient in solving geologic problems	Competence in the Disciplines Knowledge of Human Cultures and the Physical and Natural World Intellectual and Practical Skills Integrative Learning
Students will be proficient in understanding and producing geologic maps	Competence in the Disciplines Knowledge of Human Cultures and the Physical and Natural World Intellectual and Practical Skills Personal and Social Responsibility Integrative Learning

Q1.2.1.
Do you have rubrics for your PLOs?

- ○ 1. Yes, for all PLOs
- ◉ 2. Yes, but for some PLOs
- ○ 3. No rubrics for PLOs
- ○ 4. N/A
- ○ 5. Other, specify:

Q1.3.
Are your PLOs closely aligned with the mission of the university?

- ◉ 1. Yes

○ 2. No
○ 3. Don't know

Q1.4.
Is your program externally accredited (other than through WASC Senior College and University Commission (WSCUC))?

○ 1. Yes
◉ 2. No (skip to **Q1.5**)
○ 3. Don't know (skip to **Q1.5**)

Q1.4.1.
If the answer to Q1.4 is **yes**, are your PLOs closely aligned with the mission/goals/outcomes of the accreditation agency?

○ 1. Yes
○ 2. No
○ 3. Don't know

Q1.5.
Did your program use the *Degree Qualification Profile* ("DQP", see http://degreeprofile.org) to develop your PLO(s)?

◉ 1. Yes
○ 2. No, but I know what the DQP is
○ 3. No, I don't know what the DQP is
○ 4. Don't know

Q1.6.
Did you use action verbs to make each PLO measurable?

◉ 1. Yes
○ 2. No
○ 3. Don't know

(Remember: Save your progress)

Question 2: Standard of Performance for the Selected PLO

Q2.1.
Select **OR** type in **ONE(1)** PLO here as an example to illustrate how you conducted assessment (be sure you *checked the correct box* for this PLO in Q1.1):

Problem Solving

If your PLO is **not listed, please enter it here**:

Q2.1.1.
Please provide more background information about the **specific PLO** you've chosen in Q2.1.

We define problem solving in the context of geologic problem solving. For purposes of assessment, we have defined this as specific skills associated with geologic mapping: producing a map that accurately shows geologic content, interpreting that geologic content in a stratigraphic column and cross section, and writing a coherent geologic history based on that interpretation.

Q2.2.
Has the program developed or adopted **explicit** standards of performance for this PLO?

- (●) 1. Yes
- ( ) 2. No
- ( ) 3. Don't know
- ( ) 4. N/A

Q2.3.
Please **provide the rubric(s)** and **standards of performance** that you have developed for this PLO here or in the appendix.

We used one measure – a geologic field report from our capstone class, Geology 188 – to measure two different PLOs (solving geologic problems and geologic mapping). The field report is scored using a grading rubric (attached). We expect 70% of our students to score 70% or above on each item on the rubric.

Poleta_Grading_Rubric_2016.pdf
40.52 KB

No file attached

Q2.4. PLO	Q2.5. Stdrd	Q2.6. Rubric	Please indicate where you have published the **PLO**, the **standard** of performance, and the **rubric** that was used to measure the PLO:
☐	☐	☐	1. In **SOME** course syllabi/assignments in the program that address the PLO
☐	☐	☑	2. In **ALL** course syllabi/assignments in the program that address the PLO
☐	☐	☐	3. In the student handbook/advising handbook
☐	☐	☐	4. In the university catalogue
☐	☐	☐	5. On the academic unit website or in newsletters
☑	☑	☑	6. In the assessment or program review reports, plans, resources, or activities
☐	☐	☐	7. In new course proposal forms in the department/college/university
☐	☐	☐	8. In the department/college/university's strategic plans and other planning documents
☐	☐	☐	9. In the department/college/university's budget plans and other resource allocation documents
☐	☐	☐	10. Other, specify:

Question 3: Data Collection Methods and Evaluation of Data Quality for the Selected PLO

Q3.1.
Was assessment data/evidence **collected** for the selected PLO?

- (●) 1. Yes
- ( ) 2. No (skip to **Q6**)
- ( ) 3. Don't know (skip to **Q6**)
- ( ) 4. N/A (skip to **Q6**)

Q3.1.1.
How many assessment tools/methods/measures **in total** did you use to assess this PLO?
1

Q3.2.
Was the data **scored/evaluated** for this PLO?
- (●) 1. Yes
- ( ) 2. No (skip to **Q6**)
- ( ) 3. Don't know (skip to **Q6**)
- ( ) 4. N/A (skip to **Q6**)

Q3.2.1.
Please describe how you collected the assessment data for the selected PLO. For example, in what course(s) or by what means were data collected:
Data were collected from a report in GEOL 188 Advanced Field Mapping, our senior-level capstone course. All BS students take this course, and we used results from all students.

(Remember: Save your progress)

Question 3A: Direct Measures (key assignments, projects, portfolios, etc.)

Q3.3.
Were direct measures (key assignments, projects, portfolios, course work, student tests, etc.) used to assess this PLO?
- (●) 1. Yes
- ( ) 2. No (skip to **Q3.7**)
- ( ) 3. Don't know (skip to **Q3.7**)

Q3.3.1.
Which of the following direct measures (key assignments, projects, portfolios, course work, student tests, etc.) were used? [**Check all that apply**]
- [x] 1. Capstone project (e.g. theses, senior theses), courses, or experiences
- [ ] 2. Key assignments from required classes in the program
- [ ] 3. Key assignments from elective classes
- [ ] 4. Classroom based performance assessment such as simulations, comprehensive exams, or critiques
- [ ] 5. External performance assessments such as internships or other community-based projects
- [ ] 6. E-Portfolios
- [ ] 7. Other Portfolios
- [ ] 8. Other, specify:

Q3.3.2.
Please **provide** the direct measure (key assignments, projects, portfolios, course work, student tests, etc.) you used to collect data, THEN **explain** how it assesses the PLO:

The Poleta Folds mapping and field report student expectation sheet is attached, as well as guidelines for putting together a geologic report. Students are given both documents in preparation for this assignment.

This field report assesses the Geologic Problem Solving PLO because it requires students to demonstrate their proficiency in generating various geologic products (map, cross section, stratigraphic column), then synthesizing the data in these products into a report. The report showcases student ability to develop a coherent geologic history that reconciles geologic evidence both spatially and temporally.

Expectation Sheet Poleta 2016.pdf
15.12 KB

G188_ReportGuidelines.pdf
1.17 MB

Q3.4.
What tool was used to evaluate the data?

- ○ 1. **No** rubric is used to interpret the evidence (skip to **Q3.4.4.**)
- ◉ 2. Used rubric developed/modified by the faculty who teaches the class (skip to **Q3.4.2.**)
- ○ 3. Used rubric developed/modified by a group of faculty (skip to **Q3.4.2.**)
- ○ 4. Used rubric pilot-tested and refined by a group of faculty (skip to **Q3.4.2.**)
- ○ 5. The VALUE rubric(s) (skip to **Q3.4.2.**)
- ○ 6. Modified VALUE rubric(s) (skip to **Q3.4.2.**)
- ○ 7. Used other means (Answer **Q3.4.1.**)

Q3.4.1.
If you used other means, which of the following measures was used? [**Check all that apply**]

- ☐ 1. National disciplinary exams or state/professional licensure exams (skip to **Q3.4.4.**)
- ☐ 2. General knowledge and skills measures (e.g. CLA, ETS PP, etc.) (skip to **Q3.4.4.**)
- ☐ 3. Other standardized knowledge and skill exams (e.g. ETC, GRE, etc.) (skip to **Q3.4.4.**)
- ☐ 4. Other, specify: _____ (skip to **Q3.4.4.**)

Q3.4.2.
Was the **rubric** aligned directly and explicitly **with the PLO**?

- ◉ 1. Yes
- ○ 2. No
- ○ 3. Don't know
- ○ 4. N/A

Q3.4.3.
Was the **direct measure** (e.g. assignment, thesis, etc.) aligned directly and explicitly **with the rubric**?

- ◉ 1. Yes
- ○ 2. No
- ○ 3. Don't know
- ○ 4. N/A

Q3.4.4.
Was the **direct measure** (e.g. assignment, thesis, etc.) aligned directly and explicitly **with the PLO**?

- ◉ 1. Yes
- ○ 2. No
- ○ 3. Don't know

○ 4. N/A

Q3.5.
How many faculty members participated in planning the assessment data **collection** of the selected PLO?

5

Q3.5.1.
How many faculty members participated in the **evaluation** of the assessment data for the selected PLO?

2

Q3.5.2.
If the data was evaluated by multiple scorers, was there a norming process (a procedure to make sure everyone was scoring similarly)?

◉ 1. Yes
○ 2. No
○ 3. Don't know
○ 4. N/A

Q3.6.
How did you **select** the sample of student work (papers, projects, portfolios, etc.)?

Work was evaluated for all students in the class.

Q3.6.1.
How did you **decide** how many samples of student work to review?

Work was evaluated for all students in the class.

Q3.6.2.
How many students were in the class or program?

19

Q3.6.3.

How many samples of student work did you evaluated?

19

Q3.6.4.
Was the sample size of student work for the direct measure adequate?

- (●) 1. Yes
- ( ) 2. No
- ( ) 3. Don't know

(Remember: Save your progress)

Question 3B: Indirect Measures (surveys, focus groups, interviews, etc.)

Q3.7.
Were indirect measures used to assess the PLO?

- ( ) 1. Yes
- (●) 2. No (skip to **Q3.8**)
- ( ) 3. Don't Know (skip to **Q3.8**)

Q3.7.1.
Which of the following indirect measures were used? [**Check all that apply**]

- [ ] 1. National student surveys (e.g. NSSE)
- [ ] 2. University conducted student surveys (e.g. OIR)
- [ ] 3. College/department/program student surveys or focus groups
- [ ] 4. Alumni surveys, focus groups, or interviews
- [ ] 5. Employer surveys, focus groups, or interviews
- [ ] 6. Advisory board surveys, focus groups, or interviews
- [ ] 7. Other, specify:

Q3.7.1.1.
Please explain and attach the indirect measure you used to collect data:

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Q3.7.2.
If surveys were used, how was the sample size **decided**?

Q3.7.3.
If surveys were used, how did you **select** your sample:

Q3.7.4.
If surveys were used, what was the response rate?

Question 3C: Other Measures (external benchmarking, licensing exams, standardized tests, etc.)

Q3.8.
Were external benchmarking data, such as licensing exams or standardized tests, used to assess the PLO?

- ○ 1. Yes
- ◉ 2. No (skip to **Q3.8.2**)
- ○ 3. Don't Know (skip to **Q3.8.2**)

Q3.8.1.
Which of the following measures was used? [**Check all that apply**]

- ☐ 1. National disciplinary exams or state/professional licensure exams
- ☐ 2. General knowledge and skills measures (e.g. CLA, ETS PP, etc.)
- ☐ 3. Other standardized knowledge and skill exams (e.g. ETC, GRE, etc.)
- ☐ 4. Other, specify:

Q3.8.2.
Were other measures used to assess the PLO?

- ○ 1. Yes
- ○ 2. No (skip to **Q4.1**)
- ○ 3. Don't know (skip to **Q4.1**)

Q3.8.3.
If other measures were used, please specify:

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(Remember: Save your progress)

Question 4: Data, Findings, and Conclusions

Q4.1.
Please provide simple tables and/or graphs to summarize the assessment data, findings, and conclusions for the selected PLO in **Q2.1**:

A page of plots summarizing student performance in the various subcategories of the geologic field report is attached.

These plots show the cumulative proportion of the class performing at or below a particular score in each of the relevant subcategories: map interpretation and presentation, cross section interpretation and presentation, stratigraphic section interpretation and presentation; the elements the geologic report: introduction, structural geology, geologic history; and technical writing. These plots allow us to readily determine if program standards are being met, and if there are areas in which students tend to do better or worse than other areas.

G188_2016Poleta_WithPercentages.pdf
22.68 KB

No file attached

Q4.2.
Are students doing well and meeting the program standard? If not, how will the program work to improve student performance of the selected PLO?

We have set a program standard of 70% of students achieving a score of 70% in each aspect of the Poleta mapping project.

The map, cross section, and stratigraphic column are broken down into reasonable geologic interpretation (knowledge) and the mechanical aspects of producing a professional product (skill).

85% of students met the benchmark for geologic map interpretation

95% of students met the benchmark for geologic map presentation

95% of students met the benchmark for cross section interpretation and cross section presentation

100% of students met the benchmarks for stratigraphic column interpretation and presentation.

The content of the written report is broken down by section with an overall grade organization and writing style.

85% of the students met the benchmark for the introduction and overall writing style.

90% of the students met the benchmark for the geologic history and structural geology sections.

In all aspects of the project, we exceeded the program standard of 70% of students achieving a score of 70%. Though we exceeded the program standard, we noticed that if we set a slightly higher benchmark we are deficient in a few of the basic geology categories (map interpretation, structural geology, and geologic history). To address this, the instructors have updated the course with a 3-day regional field trip to introduce the students to the tectonic history, rocks, and structures of the region.

No file attached | No file attached

Q4.3.
For the selected PLO, the student performance:

- ○ 1. **Exceeded** expectation/standard
- ◉ 2. **Met** expectation/standard
- ○ 3. **Partially** met expectation/standard
- ○ 4. Did not meet expectation/standard
- ○ 5. No expectation/standard has been specified
- ○ 6. Don't know

Question 4A: Alignment and Quality

Q4.4.
Did the data, including the direct measures, from all the different assessment tools/measures/methods directly align with the PLO?

- ◉ 1. Yes
- ○ 2. No
- ○ 3. Don't know

Q4.5.
Were **all** the assessment tools/measures/methods that were used good measures of the PLO?

- ◉ 1. Yes
- ○ 2. No
- ○ 3. Don't know

Question 5: Use of Assessment Data (Closing the Loop)

Q5.1.
As a result of the assessment effort and based on prior feedback from OAPA, do you anticipate *making any changes* for your program (e.g. course structure, course content, or modification of PLOs)?

- (●) 1. Yes
- ( ) 2. No (skip to **Q5.2**)
- ( ) 3. Don't know (skip to **Q5.2**)

Q5.1.1.
Please describe *what changes* you plan to make in your program as a result of your assessment of this PLO. Include a description of how you plan to assess the impact of these changes.

The instructors have updated the course with a 3-day regional field trip to introduce the students to the tectonic history, rocks, and structures of the region. Greater foundational knowledge of the regional geologic and tectonic history will provide students with a better overall conceptual model of geologic processes in the area, and thus allow them to better differentiate between competing hypotheses that explain the geologic features on their maps and cross sections.

Q5.1.2.
Do you have a plan to assess the *impact of the changes* that you anticipate making?

- (●) 1. Yes
- ( ) 2. No
- ( ) 3. Don't know

Q5.2.

Since your last assessment report, **how have the assessment data from then been used** so far?	1. Very Much	2. Quite a Bit	3. Some	4. Not at All	5. N/A
1. Improving specific courses	( )	( )	(●)	( )	( )
2. Modifying curriculum	( )	( )	(●)	( )	( )
3. Improving advising and mentoring	( )	( )	( )	(●)	( )
4. Revising learning outcomes/goals	( )	( )	( )	(●)	( )
5. Revising rubrics and/or expectations	( )	( )	(●)	( )	( )
6. Developing/updating assessment plan	( )	( )	( )	(●)	( )
7. Annual assessment reports	(●)	( )	( )	( )	( )
8. Program review	( )	( )	( )	(●)	( )
9. Prospective student and family information	( )	( )	( )	(●)	( )
10. Alumni communication	( )	( )	( )	(●)	( )
11. WSCUC accreditation (regional accreditation)	( )	( )	( )	( )	(●)
12. Program accreditation	( )	( )	( )	( )	(●)
13. External accountability reporting requirement	( )	( )	( )	( )	(●)

14. Trustee/Governing Board deliberations	○	○	○	○	◉
15. Strategic planning	○	○	○	◉	○
16. Institutional benchmarking	○	○	○	◉	○
17. Academic policy development or modifications	○	○	○	◉	○
18. Institutional improvement	○	○	○	◉	○
19. Resource allocation and budgeting	○	○	○	◉	○
20. New faculty hiring	○	○	○	◉	○
21. Professional development for faculty and staff	○	○	○	◉	○
22. Recruitment of new students	○	○	○	◉	○

23. Other, specify:

Q5.2.1.
Please provide a detailed example of how you used the assessment data above:

Assessment data from 2015-2016 were discussed at faculty meetings, and used to inform instructors of the need to incorporate more applications of complex problem solving into courses, including strategies for evaluating multiple working hypotheses.

Q5.3. To what extent did you apply **last year's feedback** from the Office of Academic Program Assessment in the following areas?	1. Very Much	2. Quite a bit	3. Some	4. Not at All	5. N/A
1. Program Learning Outcomes	○	○	○	○	◉
2. Standards of Performance	○	○	○	○	◉
3. Measures	○	○	○	○	◉
4. Rubrics	○	○	○	○	◉
5. Alignment	○	○	○	○	◉
6. Data Collection	○	○	○	○	◉
7. Data Analysis and Presentation	○	○	◉	○	○
8. Use of Assessment Data	○	○	◉	○	○
9. Other, please specify:	○	○	○	○	○

Q5.3.1.
Please share with us an example of how you applied **last year's feedback** from the Office of Academic Program Assessment in any of the areas above:

In 2015-16 OAPA suggested we include greater discussion of our data analysis, so we have included more information about the data analysis process in this year's assessment report.

(Remember: Save your progress)

Additional Assessment Activities

Q6.
Many academic units have collected assessment data on aspect of their program *that are not related to the PLOs* (i.e. impacts of an advising center, etc.). **If** your program/academic unit has collected data on program *elements*, please briefly report your results here:

No file attached No file attached

Q7.
What PLO(s) do you plan to assess next year? [**Check all that apply**]

- ☐ 1. **Critical Thinking**
- ☐ 2. **Information Literacy**
- ☐ 3. **Written Communication**
- ☐ 4. **Oral Communication**
- ☐ 5. Quantitative Literacy
- ☐ 6. **Inquiry and Analysis**
- ☐ 7. Creative Thinking
- ☐ 8. Reading
- ☐ 9. Team Work
- ☐ 10. Problem Solving
- ☐ 11. Civic Knowledge and Engagement
- ☐ 12. **Intercultural Knowledge, Competency, and Perspectives**
- ☐ 13. Ethical Reasoning
- ☐ 14. Foundations and Skills for Lifelong Learning
- ☐ 15. **Global Learning and Perspectives**
- ☐ 16. Integrative and Applied Learning
- ☐ 17. Overall Competencies for GE Knowledge
- ☐ 18. **Overall Disciplinary Knowledge**
- ☐ 19. **Professionalism**
- ☐ 20. Other, specify any PLOs not included above:

a.
b.
c.

Q8. Please attach any additional files here:

No file attached | No file attached | No file attached | No file attached

Q8.1.
Have you attached any files to this form? If yes, please list every attached file here:

Program Information (**Required**)

Program:

(If you typed your program name at the beginning, please skip to Q10)

Q9.
Program/Concentration Name: [skip if program name appears above]
BS Geology

Q10.
Report Author(s):
Amelia Vankeuren

Q10.1.
Department Chair/Program Director:
Tim Horner

Q10.2.
Assessment Coordinator:
Amelia Vankeuren

Q11.
Department/Division/Program of Academic Unit
Geology

Q12.
College:
College of Natural Science & Mathematics

Q13.
Total enrollment for Academic Unit during assessment semester (see Departmental Fact Book):
90

Q14.
Program Type:
◉ 1. Undergraduate baccalaureate major

- ○ 2. Credential
- ○ 3. Master's Degree
- ○ 4. Doctorate (Ph.D./Ed.D./Ed.S./D.P.T./etc.)
- ○ 5. Other, specify:

Q15. Number of **undergraduate degree programs** the academic unit has?
3

Q15.1. List all the names:
BS Geology

BA Geology

BA Earth Science

Q15.2. How many concentrations appear on the diploma for this undergraduate program?
0

Q16. Number of **master's degree programs** the academic unit has?
1

Q16.1. List all the names:
MS Geology

Q16.2. How many concentrations appear on the diploma for this master's program?
0

Q17. Number of **credential programs** the academic unit has?
0

Q17.1. List all the names:

Q18. Number of **doctorate degree programs** the academic unit has?
0

Q18.1. List all the names:

When was your **assessment plan**...	1. Before 2011-12	2. 2012-13	3. 2013-14	4. 2014-15	5. 2015-16	6. 2016-17	7. No Plan	8. Don't know
Q19. developed?	◉	○	○	○	○	○	○	○
Q19.1. last updated?	○	○	◉	○	○	○	○	○

Q19.2. (REQUIRED)
Please **obtain** and **attach** your latest **assessment plan**:

No file attached

Q20.
Has your program developed a **curriculum map?**

◉ 1. Yes
○ 2. No
○ 3. Don't know

Q20.1.
Please **obtain** and **attach** your latest **curriculum map**:

Geology%20curriculum%20mapping.pdf
132.63 KB

Q21.
Has your program indicated in the curriculum map where assessment **of student learning** occurs?

◉ 1. Yes
○ 2. No
○ 3. Don't know

Q22.
Does your program have a capstone class?

◉ 1. Yes, indicate: GEOL 188
○ 2. No
○ 3. Don't know

Q22.1.
Does your program have **any** capstone project?

◉ 1. Yes
○ 2. No
○ 3. Don't know

Grading Rubric **Poleta Folds Project** **2016** **Name:**_____

Project Score	**/15**

Map Rubric

Dimension	Needs Improvement (6)	Satisfactory (8)	Exceptional (10)	Score
1. Geologic Interpretation (Knowledge, Skill)	Detail of contacts, locations, structures display major errors. Poor representation of other criteria.	Geology is mostly well located and structures are mostly complete. Large scale features are represented, but most small scale features are not. Most geologic units are correctly assigned. Most other criteria adequate	Geology correctly located. Geologic units are correctly assigned. All Polygons labeled. Structures are complete and well marked. Both small and large scale features are represented. Abundant S&D's; well distributed; show structure.	
Dimension	**Needs Improvement (3)**	**Satisfactory (4)**	**Exceptional (5)**	**Score**
2. Symbology and Presentation (Skill)	Generally not neat with frequent errors or omissions. Inexacty or sloppy drafting distracts from map presentation, or is in an incorrect form.	Clean, neat. Layout of explanation, key, etc., is mostly clear and supportive of map presentation. The "big picture" is clear from the map and supporting materials.	Clean, neat. Meets or approaches professional standards. Layout of explanation, name, scale date, etc., is clear and supportive of map presentation. Attention to detail is evident.	
Quality/Detail of map at end of day 4	-2	0	+2	
			Total Points	/15
			Normalize	**/4.5**

Cross Section (A-A')

Dimension	Needs Improvement (4)	Satisfactory (5)	Exceptional (6)	Score
1. Geologic Interpretation *(Knowledge, Skill)*	Detail of section construction, stratigraphy and structure show major errors. Interpretation is not geologically reasonable. No dip corrections.	Section mostly matches map in position structural features and attitudes. Most small and large scale features are represented. Some structures project into section. Form lines or lithologic symbols show most of the nature of bedding and structure within each unit. Geologic units are mostly correct. Dip correction was done, but incorrectly.	Section matches map in position structural features and attitudes. Both small and large scale features are represented. Structures project into section. Form lines or lithologic symbols show the nature of bedding and structure within each unit. Geologic units are correctly assigned. Bedding corrected for apparent dip.	
2. Symbology (Skill)	Major errors in the symbols and markings are mostly used. Many polygons are not labeled with the correct unit symbol. Unexplained symbols are common.	Correct symbols and markings are mostly used. Most polygons are labeled with the correct unit symbol. Most symbols and designations used in section are explained in the explanation. Drawn to a depth that shows most of the known or measured stratigraphy.	Correct symbols and markings are used for structural features and contacts. Each polygon is labeled with the correct unit symbol. All symbols and designations used in section are explained in the explanation. Drawn to depth of known or measured stratigraphy.	
3. Presentation (Skill, Affect)	Inexact or sloppy drafting distracts from section presentation, or is in an incorrect form. Legend and labeling are missing many elements. Vertical exaggeration was used.	Clean, neat; layout of legend, key, etc., is clear and supportive of map presentation. The "big picture" is clear from the section.	Clean, neat; meets or approaches professional standards; layout of legend, name, no vertical exaggeration on scale, date, etc., is clear and supportive of map presentation. Attention to detail is evident.	
			Total Points	/18
			Normalize	/2.25

Stratigraphic Column **(from previous rubric)**

	Total Points	/15
	Normalize	/2.25

Introduction

Dimension	Needs Improvement (6)	Satisfactory (8)	Exceptional (10)	Score
1. Organization and Writing Style (Skill)	Poor organization; Difficult to follow. 4 or more of these errors	Organization and writing is good with a few exceptions. Up to 2 of these errors in section	Well Organized and well written. Writing flows between topics. No typos, grammatical errors, misspellings Proper use of references	
2. Content (Knowledge)	< 5 of these included in section.	5 of these included in section.	Includes 6 of these: -Intro statement, why project (G188). -Location: White Inyo Mtn Range. -Location Map good; should be able to drive to area; reference data. -Semi arid, 1850 m elevation, sage and Juniper trees, lizards and snakes. -Mapped using topo base map, Brunton compass, Jacob staff. -Mapped Cambrian sedimentary rocks and structure. -Previous work cited. -Acknowledgements.	
			Total Points	/20
			Normalize	**/1.5**

Structural Geology

Dimension	Needs Improvement (6)	Satisfactory (8)	Exceptional (10)	Score
1. Organization and Writing Style (Skill)	Poor organization; Difficult to follow. 4 or more of these errors	Organization and writing is good with a few exceptions. Up to 2 of these errors in section	Well Organized and well written. Writing flows between topics. No typos, grammatical errors, misspellings Proper use of references	
2. Content Structure (Knowledge)	< 3 of these included in section.	3 of these included in section.	Includes 4 of these: -Description of fold geometry -Description of fault geometry -Stereonet plot and analysis -NW-SE compression leads to doubling of section by thrust faults and a series of folds with NE-SW axes -E-W compression produces the White-Inyo anticlinorium, leading to doubly plunging folds -Strike slip faults	
			Total Points	/20
			Normalize	**/2.25**

Geologic History

Dimension	Needs Improvement (6)	Satisfactory (8)	Exceptional (10)	Score
1. Organization and Writing Style (Skill)	Poor organization; Difficult to follow. 4 or more of these errors	Organization and writing is good with a few exceptions. Up to 2 of these errors in section	Well Organized and well written. Writing flows between topics. No typos, grammatical errors, misspellings References	
2. Content (Knowledge)	< 7 of these included in section.	7 of these included in section.	Includes 9 of these(dashed): **Deposition in the Cambrian** -passive margin -tropical shallow marine, tidal flat, broad area. **Late Pz Antler Orogeny** - thrust faulting **Nevadan Orogney** -folding (regional deformation) -high angle faulting -brittle faulting last **Cenozoic Basin and Range:** -Extension and normal faulting -Uplift of White-Inyo range -Deep Springs graben **Erosion:** -Quaternary erosion exposes units and current topography. **Extra Credit:** -Dike -left lateral faulting	
			Total Points	/20
			Normalize	**/2.25**

GEOLOGIC REPORT WRITING

PREPARATION OF GRAPHICS

Graphic plates of a report are typically prepared prior to construction of the written report. The three main graphical components and core of the geologic report are the geologic map, the stratigraphic column and the geologic cross section, typically prepared in this order. From the geologic map, a stratigraphic column and cross section can be created to illustrate geology of a field area in three dimensions.

Geologic Map

The geologic map is a precisely oriented, scaled-down diagram of the earth's surface; it represents the total of physical data collected and recorded in a particular field area, drafted on a topographic base map. Rock units and structures are identified in an explanation, which also shows the age sequence of the rock units (Compton, 1985).

Stratigraphic Column

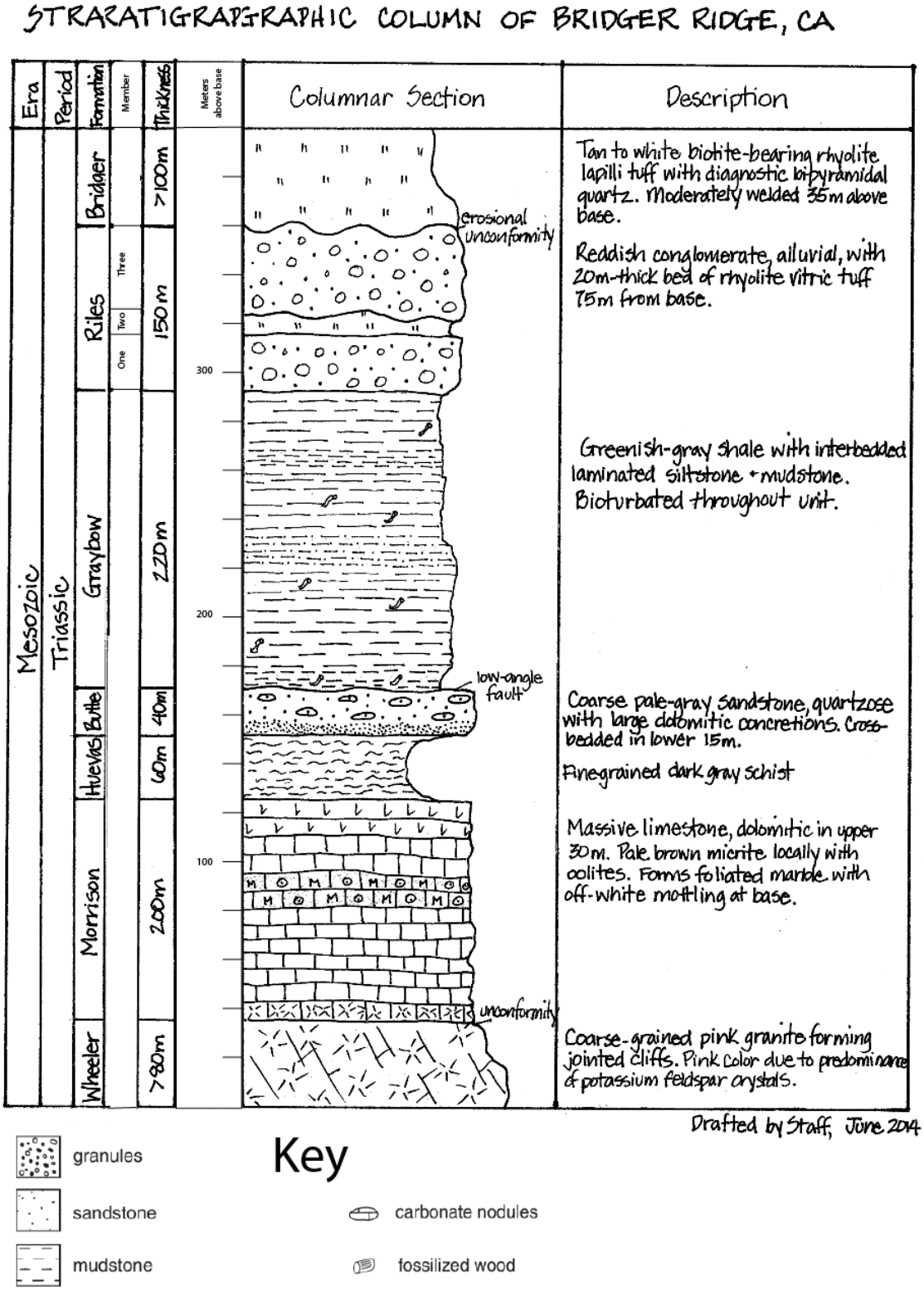
Usually the second step in preparing graphics is drawing the stratigraphic column(s). This may be created from actual field measurements (refer to 'Measuring Sections' segment of the Manual), or from calculations made directly from the geologic map.

Graphic representation of measured sections forms the basis for many types of stratigraphic and geologic maps and reports. They are used to record detailed observations of samples for paleontology, magnetostratigraphy, sedimentology, volcanology, paleocurrent analysis, or any data for which stratigraphic information is needed. A stratigraphic column is the most common method of presenting measured section data. The column is a scale model of the measured sequence presented symbolically in two dimensions; the scale used will depend on the detail necessary for a particular study. Each unit measured in the field is represented on the column by a thickness and pattern. Sedimentary structures are shown within the lithologic pattern or described in a separate parallel column. In addition, all information relevant to the study must be presented on the column by symbols, codes, drawings or verbal descriptions.

Compton's Appendix 9 gives examples of lithologic, fossil and structure symbols commonly used in stratigraphic columns. When drawing a measured section the size and scale of a pattern should be varied to present a visual record of what the rock really looks like. If the features you encounter in outcrop cannot easily be represented by one of Compton's symbols or patterns, you should innovate and create your own symbols. *Always include all symbols, including those borrowed from Compton, in an explanation that is part of the stratigraphic column plate.* Every plate needs to "stand alone" as an independent document.

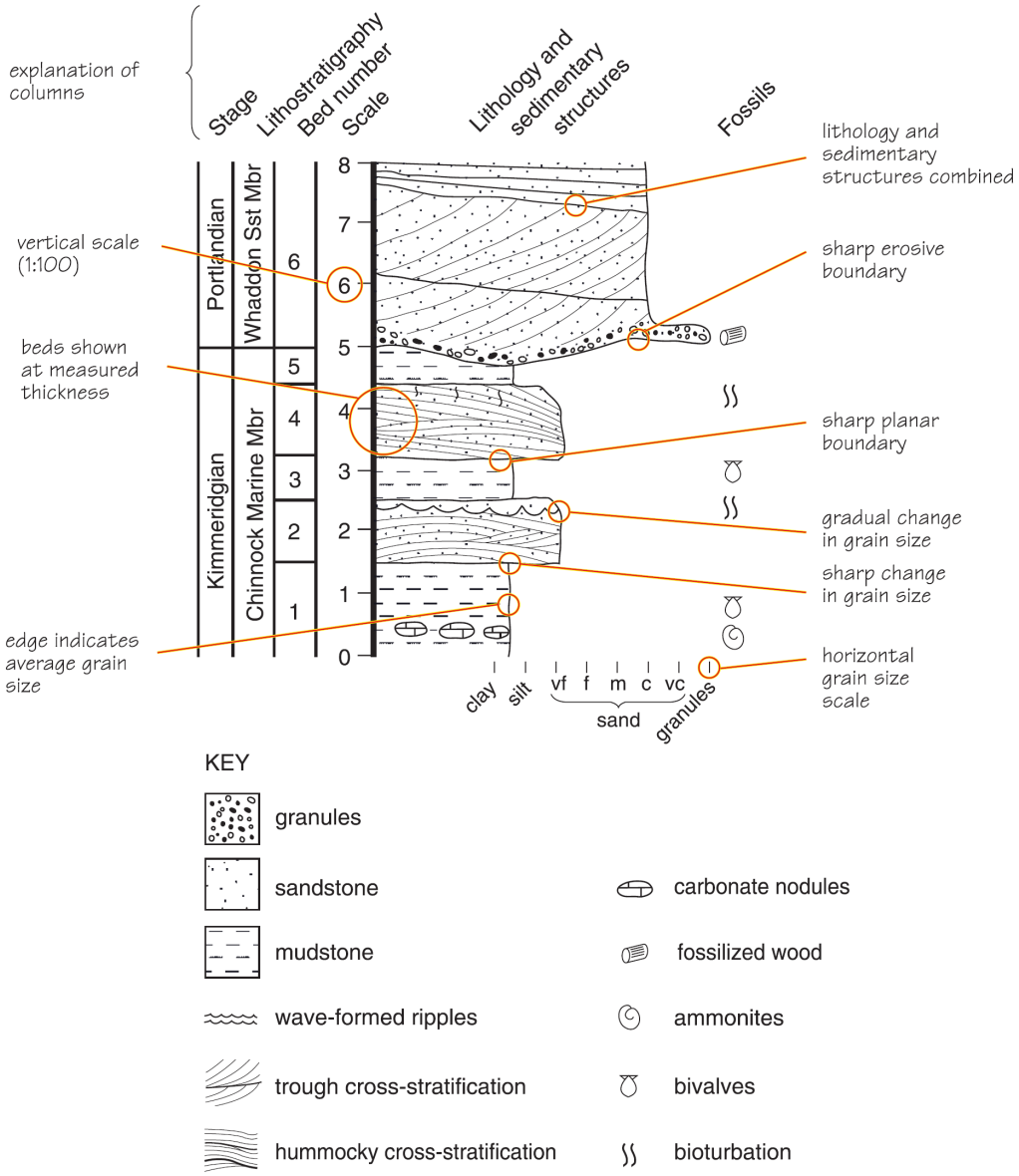
If the data for the column is obtained from outcrops, then an erosional relief profile ("relief style" or "weathering profile") is often utilized to represent the relative resistance to weathering of lithologic units. Refer to figure below. It should be stressed that the stratigraphic column is an opportunity to represent graphically and artistically the character and appearance of the lithologic units and outcrops. Contacts and features should reflect what is seen in the field.

Figure 7: Example of Ideal Stratigraphic Column with Weathering Profile.



If data is not obtained from outcrops, a more graphical, rather than a realistic, style is acceptable. Other stratigraphers prefer to use the margin of the column to graphically portray the grain size of the sediment, such as in figure below. We will not be using this method for this course.

Figure 8: A published version of a typical graphic log with some of the key features labeled (Coe, 2010).



The detail and amount of information presented in the description column will be determined by the objectives of the study and the scale of the stratigraphic column. The description column should include only descriptions and not interpretations. For example, if there are thick tabular sets of planar cross beds, you should not call them intertidal sandwaves or even straight-crested megaripples as these are interpretations, not descriptions. Abbreviations are often used in your field notebook. However, for geologic reports, including figures and plates, avoid abbreviations. Try to utilize a standard and consistent format for your descriptions. For example, begin with rock type, then describe distinctive features, moving to more min-

eralogic detail. No drafted stratigraphic column is complete without title, location and date of study, the geologist's name and explanation.

Geologic Cross Sections
The third standard geologic graphic is the cross section, which views the earth as if it were cut open and seen from the side. Geologic cross sections are interpretative, since the unit relations generally cannot be viewed directly. Only in areas of deep canyons or high mountains can natural cross sections be observed. In most cases cross sections require inference about subsurface structure, and interpretations of the geologic map. Sometimes drill holes or geophysical exploration data provide information from which cross sections can be constructed.
When selecting your own cross section line, select one which will develop as much of the mapped geology as possible, and which will pass through or near areas where data is reliable and abundant.

Cross Section Formatting - Refer to example on following page.

Most important points:

- Construct accurate topographic profile using all topographic lines, not just index topographic lines.
- Make sure the location of lithological contacts on cross section and map correlate. Physically fold your cross section and place it against the cross section line on your map to make sure contacts correlate.
- Dips of strata at the surface of your cross section and dips shown on map must correlate.
- Make sure the shape of subsurface structures is accurate.
- If section line is oblique (more than 10° off perpendicular to strike of strata), then apparent dip must be calculated for use in cross section.

Also important:

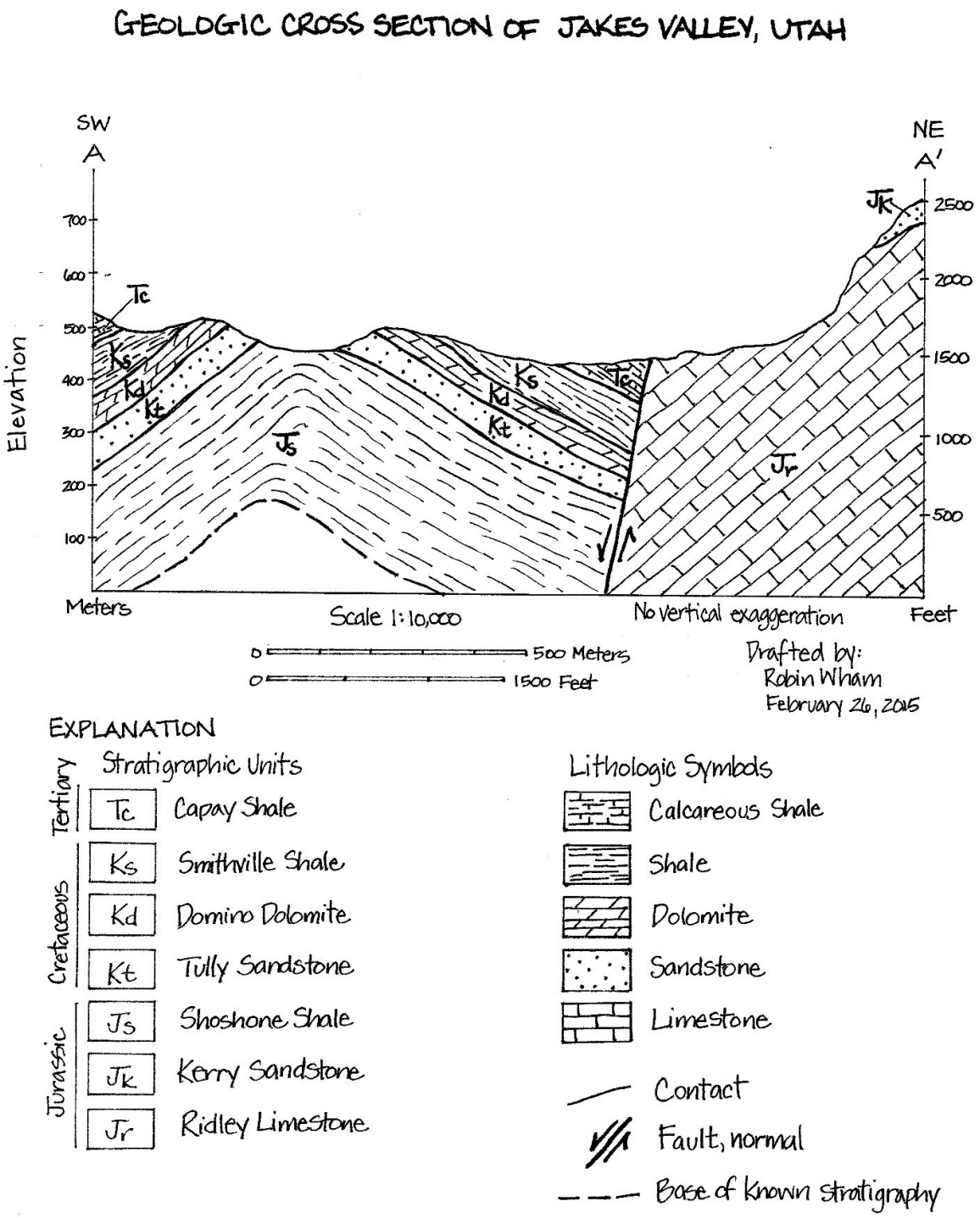
- A descriptive title, all in caps.
- Place in the subsurface only rock units and structures that you believe exist. It is acceptable to leave parts of your cross section empty.
- Profile should be just deep enough to show all relevant structure. Don't try to reflect the Moho.
- Use lithologic symbols.
- Lithologic symbols should be parallel to stratigraphic dip.
- Use unit symbols (e.g., Kd) for all cross section polygons. It is acceptable to use a line to point to small polygons.
- Unit symbols should follow standard style, as directed by instructor.
- Always include "Explanation" with full name of formation, unit symbol (e.g., Kd), and age of formation/unit.
- Explain all symbols used on cross section.

Always include:

- Scale - ratio (e.g. 1:10000).
- Scale - graphic; use both metric and English, and equally-spaced, natural divisions.
- Elevation (in meters and feet) along left and right edges of cross section box.
- The phrase "No vertical exaggeration".

- "Drawn by" or "Drafted by"... and date of construction of cross section.
- Label compass directions of right and left side of cross section.
- Label A and A', B and B', etc.

Figure 9: Example of a geologic cross section.



GENERAL OUTLINE FOR REPORTS
(Refer to Ch.16, p. 354, Compton, R. 1985. Geology in the Field)

Technical writing consists of being able to clearly describe your ideas through the use of proper grammar, terminology, and correct spelling. Technical writing is impersonal, so do not use "I", "we" (first person), nor "you" (second person). A geologic report should be written objectively, in the third person. Faults and formations do not "run" they do trend and extend while outcrops do not outcrop they crop out. Cite references in text and include in a works cited page. Write out numbers less than 10 (e.g., eight). Make sure each section is of proper length and meets all the requirements of the assignment.

Introduction

- Orient the reader with a location map, access to area, and flora/fauna in the region
- A discussion of the nature and scope of study: introduce topic
- A discussion of why this study is significant; the geologic purpose
- A description of methods used in the study, scale of map, and time involved.
- General description/overview of rock types
- A brief survey of previous work done in the region

Regional Geology
Describe the large scale geologic features of the region. Summarize any previous work in the region. Include regional stratigraphy, structure, and setting. This is not a chronological description of how the area developed geologically. Describe the structural setting, general character of rock (e.g., thick sequence of carbonate rocks), and the general geomorphology.

Lithology
Rock units are described oldest to youngest. Include unit thickness, contact type, structures, and fossils present. A suggestion is to make tables when possible. Refer to Appendix C for examples of outcrop and lithologic descriptions. Do not make this a geologic history. Lithology is a description of the rocks not a chronology or interpretation.

Sedimentary Rocks
Clastic Rocks: Describe color, texture (grain size, sorting, roundness) fabric, bedding characteristics, mineralogy (minerals and %), cementation, maturity (compositional and textural), and classify in the proper scheme. Refer to Appendix G or H. Carbonate Rocks: Describe color, allochems (grains: type, %, size), matrix/cement, small scale structures, and classify accordingly.

Igneous Rocks
Describe color, mineralogy (minerals, %), crystallinity, granularity, crystal size distribution, crystal development, intrusive/extrusive, and then name using appropriate scheme. Refer to Appendices D, E and F.

Metamorphic Rocks
Describe color, fabric, grain size, mineralogy, other structures, and then name by convention.

Structure
Include an introductory statement about the area. The structural geology section should have subheadings by general types of structures, as follows:

Folds
Faults
Joints
Cleavage/schistosity/foliations

Structural geology involves the study of four dimensions, three of space (geometry) and one of time. Full descriptions include features such as:

- The dip and strike of planar features (beds, faults, cleavage, etc.)
- The plunge and bearing of linear features (lineations, fold axes, etc.)
- The length of the features (faults, axial traces of folds, etc.)
- The amount of offset on faults
- The type of offset on faults (normal, strike slip)
- The relative inclination of the limbs of folds and the amount of dip
- The relative age of features based upon cross cutting features

Once data has been presented, summarize and **interpret** the structures and how they associate with the tectonics of the region. **Note:** Your interpretation of the structures will appear again in the Geologic History section.

Geomorphology
Describe the major geomorphic features of the study area, including erosional patterns and valleys, hills/mountains and outcrop textures. Describe major landforms, competent vs. incompetent rock types or units, stream patterns and distribution.

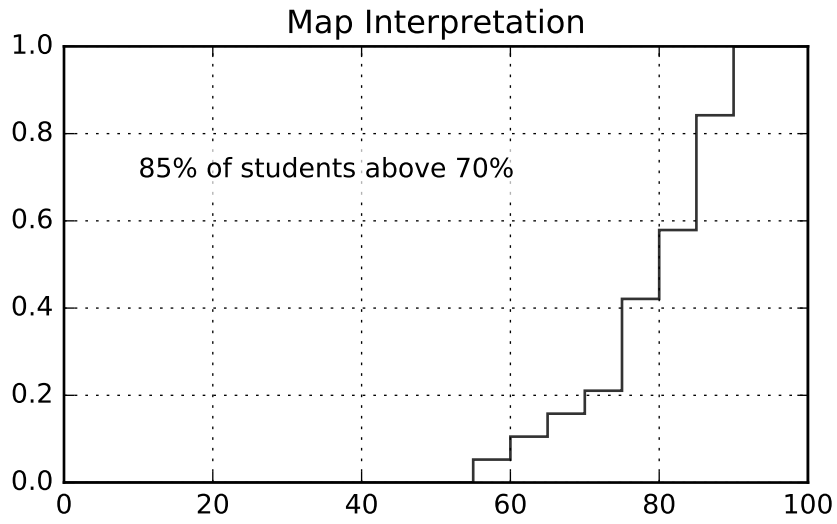
Geologic History
This section of the report is where your interpretations are presented on how the region developed geologically. Give a history of the geologic events in order from oldest to youngest. Include broad statements about tectonic setting. Cite evidence for every point made. Events might include:

- Deposition – include composition, age, thickness and an interpretation of depositional environment
- Intrusion- give rock type, age, type of intrusive body, map location
- Eruption – give rock type, age, regional extent and source location
- Metamorphism – include degree/grade, orientation of any foliation and interpretations of the dynamic forces involved
- Deformation- give timing, map location, interpretation of orientation
- Faulting - give type and orientation of the dynamic force(s) for each fault/group of faults
- Unconformity – describe type, location on map, timing of the erosion or nondeposition
- Erosion – give the timing and geomorphologic result (when, what units more resistant to erosion)

Figures and Plates
Take photos, make sketches and use figures where appropriate. Reference all figures in text before showing them. In figure caption include all information necessary to be fully self-explanatory (location, direction of view, features shown, etc). Do not use plastic sheet protectors for report pages or figures.

Figures are within the text of a report. Plates typically are full-page graphics, such as the Geologic Map, Cross Section and Stratigraphic Column. Plates are physically separate from a report and are included in a pocket of the report's folder. Use provided folders. Plates are documents that need to "stand alone". In other words, they have all the necessary information on them to be used separately from the report.

Note: The reference papers that you have been given are an excellent resource for understanding how geologic reports are written.


Map Interpretation
85% of students above 70%
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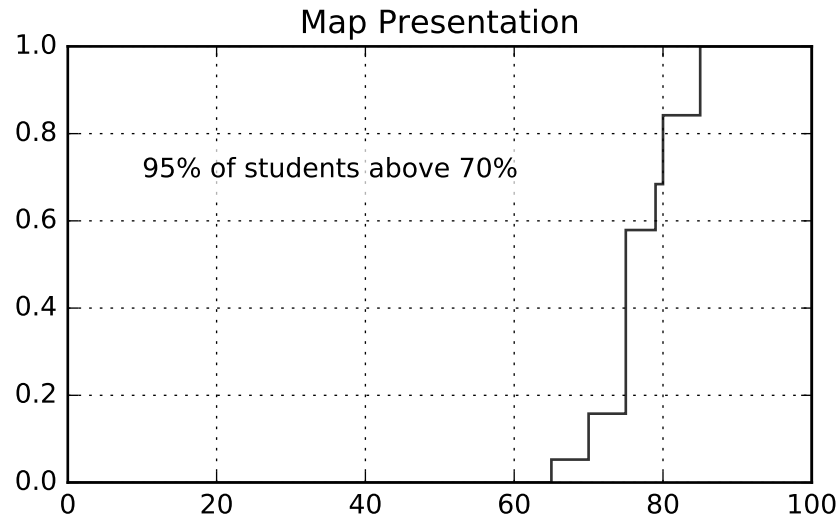
Map Presentation
95% of students above 70%
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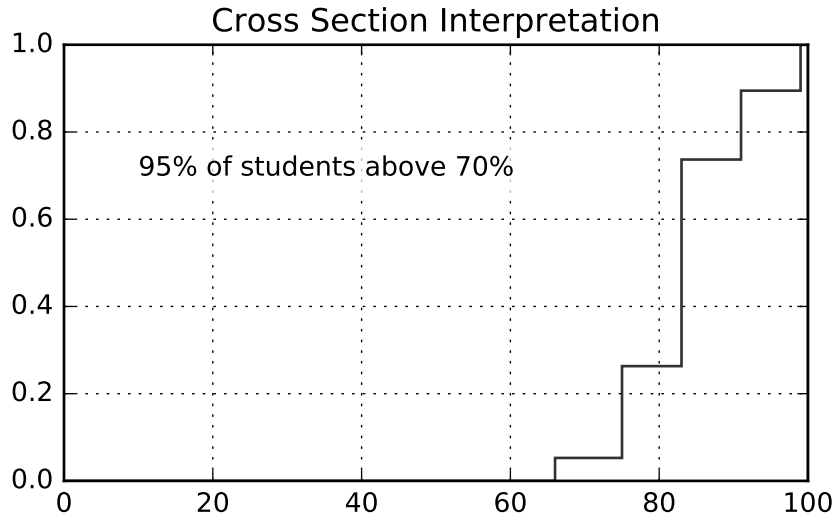
Cross Section Interpretation
95% of students above 70%
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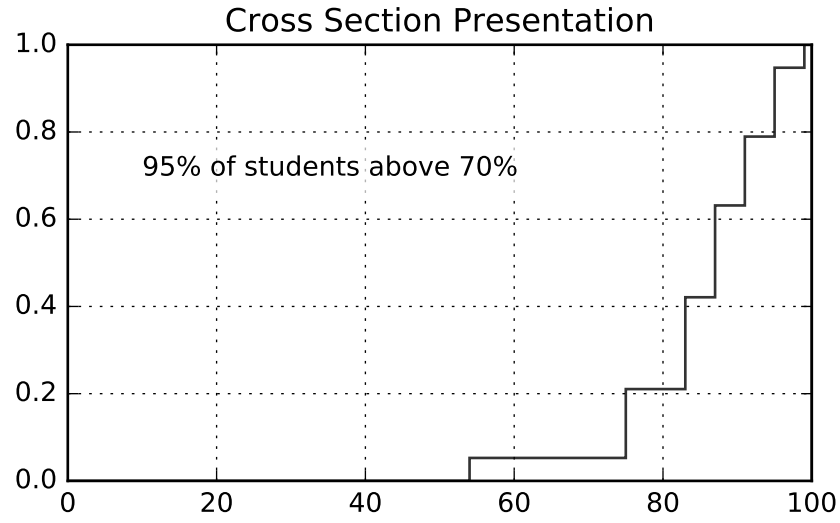
Cross Section Presentation
95% of students above 70%
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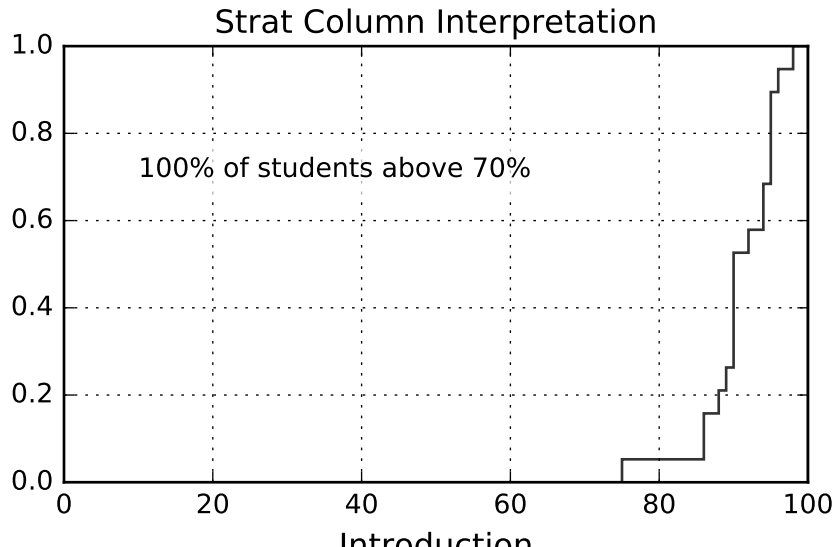
Strat Column Interpretation
100% of students above 70%
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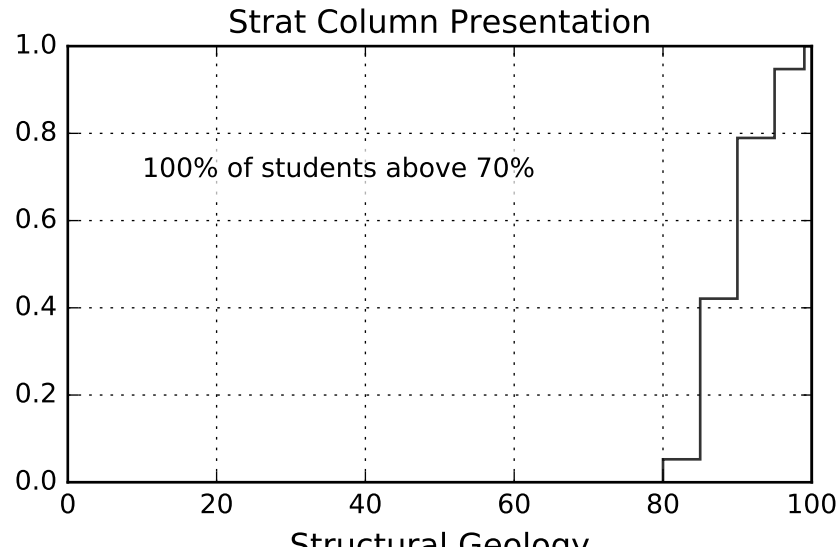
Strat Column Presentation
100% of students above 70%
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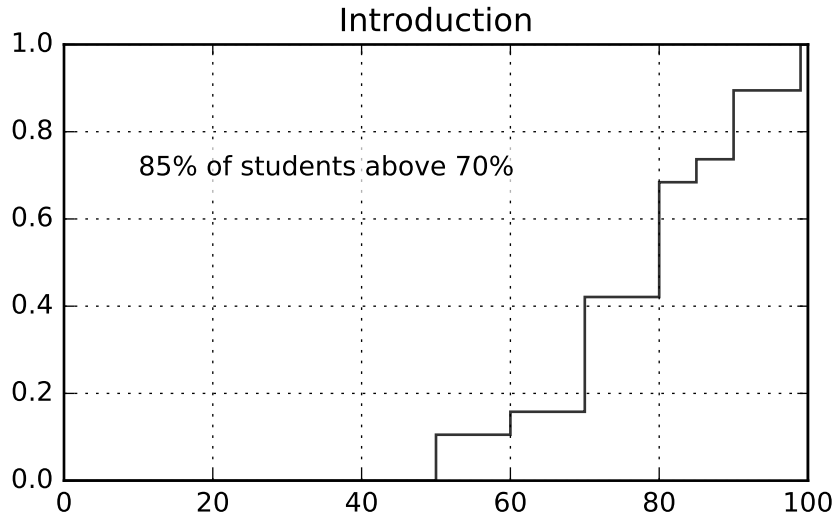
Introduction
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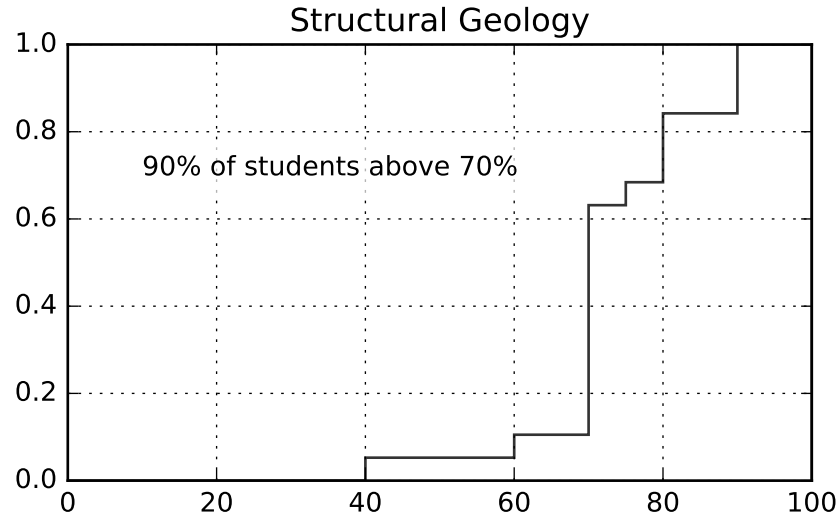
Structural Geology
90% of students above 70%
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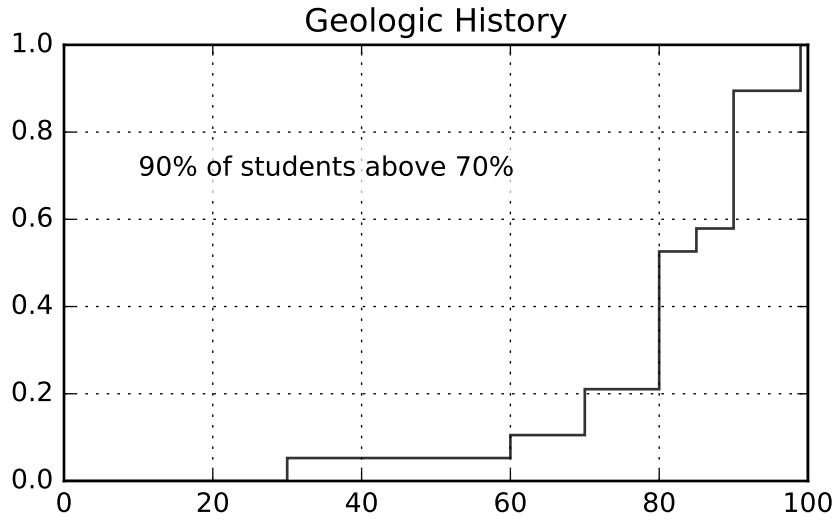
Geologic History
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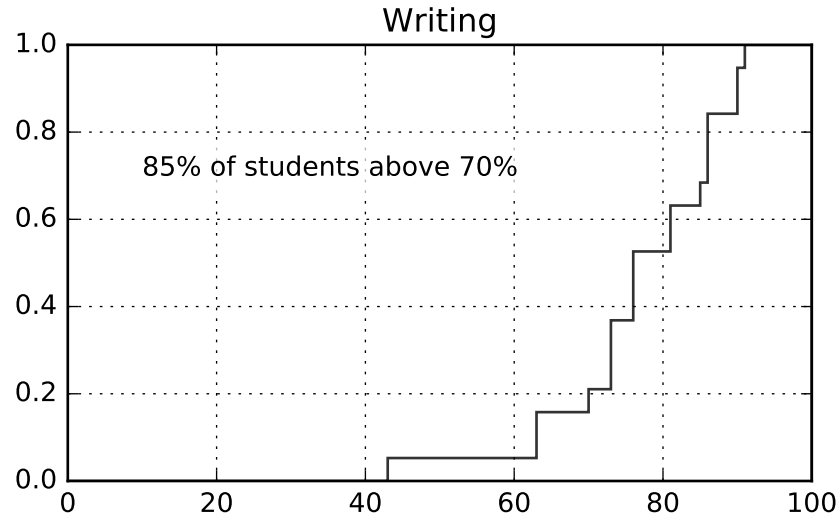
Writing
85% of students above 70%
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Curriculum Map: Geology BS and BA

Linking Program Learning Outcomes[1] (PLO) to Each Course in the Curriculum (number of Learning Outcomes varies per program)

Outcomes (PLOs) / **Courses**	**Outcome 1:** Students will master a set of fundamental geologic concepts essential to understanding and solving geologic problems	**Outcome 2:** Students will be proficient in solving geologic problems	**Outcome 3:** Students will be proficient in (BA: introductory) skills of understanding and producing geologic maps	**Outcome 4:** Students will be proficient writers, skilled in the genres of scientific and technical writing	**Outcome 5:**	**Outcome 6:**	**Outcome 7:**	**Outcome 8:**
Required Courses								
GEOL 10	I	I						
GEOL 10L	I	I	I					
GEOL 12	I	I		I				
GEOL 12L	I	I	I					
GEOL 100	D	D						
GEOL 102	D	D						
GEOL 103	D	D	D	D				
GEOL 110A	D	D	D					
GEOL 110B	D	D	D	D				
GEOL 111A	D	D	D					
GEOL 111B	M	M	M	M				
(GEOL 188 – only in BS)	M	M	M	M				
Elective Courses								
GEOL 105	M	M		D				
GEOL 112	M	M						
GEOL 114	M	M		D				
GEOL 120	M	M						
GEOL 123	M	M						
GEOL 125	M	M						
GEOL 127	M	M						
GEOL 150	M	M	M					

GEOL 171	M	M						
GEOL 190A	M	M						
GEOL 190C	M	M						
GEOL 198A	M	M		M				
GEOL 198B	M	M		M				

[1] use “I” for “Introduced”, “D” for “Developed”, and “M” for “Mastered”.

Table 2.5b: Curriculum Map: Earth Science BA

Linking Program Learning Outcomes[1] (PLO) to Each Course in the Curriculum (number of Learning Outcomes varies per program)

Outcomes (PLOs) / **Courses**	**Outcome 1:** Students will master a set of fundamental earth science concepts essential to understanding and solving geologic problems	**Outcome 2:** Students will be proficient in solving geologic problems	**Outcome 3:** Students will be proficient in introductory skills of understanding and producing geologic maps	**Outcome 4:** Students will be proficient writers, skilled in the genres of scientific and technical writing	**Outcome 5:**	**Outcome 6:**	**Outcome 7:**	**Outcome 8:**
Required Courses								
GEOL 5, GEOL 7, GEOL 8 or GEOL 10	I	I						
GEOL 8L or 10L	I	I	I					
ASTR 4B & ASTR 6								
BIO 1 & BIO 2; OR BIO 7								
CHEM 1A OR CHEM 6A								
GEOL 12	I	I		I				
GEOL 12L	I	I	I					
GEOL 17 (currently being changed to GEOL)	D	D						
MATH 26A	I							
PHYS 5A & PHYS 5B	I, D							
GEOG 111	D							
GEOL 103	D	D	D	D				
GEOL 111A	D	D	D					
GEOL 111B	M	M	M	M				
GEOL 130	D	D		M				
Elective Courses								
GEOL 105	M	M		D				
GEOL 110A	M	M	M					
GEOL 114	M	M		D				
GEOL 120	M	M						

GEOL 140	M	M		M				
GEOL 184	I	M	I					
ANTH 124	D							
ANTH 151	D		M					
ENGL 120P				M				
GEOG 113	D							
GEOG 116	D							
GEOG 117	D			M				
GEOG 161	D			M				
JOUR 131				M				
PHIL 125	D							
RPTA 153	D							

[1] use “I” for “Introduced”, “D” for “Developed”, and “M” for “Mastered”.

Table 2.5c: Curriculum Map: Geology MS

Linking Program Learning Outcomes[1] (PLO) to Each Course in the Curriculum (number of Learning Outcomes varies per program)

Outcomes (PLOs) / Courses	**Outcome 1:** Students will be able to read and digest complex scientific papers in the discipline, assess competing hypotheses and reach rational and logical conclusions.	**Outcome 2:** Students will be able to evaluate and interpret real-world data sets and use discipline-specific analytical tools to generate insight into discipline specific geologic problems.	**Outcome 3:** Students will develop presentation skills and the ability to relay technical data and scientific concepts to diverse audiences.	**Outcome 4:** Students will demonstrate the ability to obtain, assess, and analyze information from a variety of sources.	**Outcome 5:** Students will demonstrate an understanding of professional integrity.	**Outcome 6:** Students will demonstrate relevant knowledge and application of intercultural and/or global perspectives.	**Outcome 7:**	**Outcome 8:**
Required Courses								
GEOL 200	X	X	X		X	X		
GEOL 275	X	X	X	X				
GEOL 290	X	X	X	X	X			
Elective Courses								
GEOL 202	X	X	X	X	X			
GEOL 208	X	X	X	X	X			
GEOL 212	X		X	X	X	X		
GEOL 213	X	X	X	X	X	X		
GEOL 218	X	X	X	X				
GEOL 220	X	X	X	X	X	X		
GEOL 227	X	X	X	X	X			
GEOL 240C	X		X	X	X	X		
GEOL 500	X	X	X	X	X	X		
GEOL 596	X	X	X	X				

[1] Note: currently courses are marked with an "X" to indicate which ones contain PLOs. Eventually course map will include "I" for "Introduced", "D" for "Developed", and "M" for "Mastered", but those determinations are still in progress.

Poleta Folds 2016 Expectation Sheet **Course Points: /15**

Geologic Map	**Comments**	
category 1: geologic content		
contacts		
units		
detail		
Structure content		
attitudes		
structures		
category 2: symbology / format		
correct formatting, title, etc.		
explanation		
category 3: presentation drafting		
	Total	**/30**
Geologic Cross Section		
category 1: geologic content		
category 2: format / symbology / explanation		
category 3: presentation / drafting		
	Total	**/15**
Stratigraphic Column		
category 1: geologic content		
category 2: symbology / format / explanation		
category 3: presentation / drafting		
	Total	**/15**
Geologic Report	**3-5 pages, 1.5 line spacing, 12pt font**	
Introduction		/10
Structural Geology -include stereonet figure		/15
Bulleted Geologic History		/15
	Total	**/40**
	Late turn-in (minimum deduction -10)	
	Total	**/100**