Geology MS Program—Example of Inclusive Polytechnic Educational Experience

May 2018

Summary

Our **GSC 600-694-696 Master's Thesis course sequence** is an excellent example of an educational experience that hits most elements of an "Inclusive Polytechnic Education." All Geology MS students must complete a formal scientific thesis to earn a Master's degree.

Students work closely with a Geology faculty supervisor (sometimes two supervisors) on directed research leading to completion of a **Master's Thesis Proposal** (GSC 600--1 quarter unit), **Master's Thesis Research** (GSC 694—5 quarter units), and **Master's Thesis** (GSC 696--3 quarter units). This mentored learning experience intentionally addresses **Application of Knowledge**; **Creative Discovery and Innovation**; **Critical Thinking and Problem Solving**; and **Integration of Technology** at a significant level. Commonly the lead graduate student works with undergraduate student assistants, thereby achieving **Collaborative Learning**. The impact to student is best exemplified by attainment of practical **Professional and Career Readiness** essential to landing industry jobs or acceptance to PhD programs.

Assessment

The assessment process starts with interaction between the student and graduate faculty supervisor while developing the **Thesis Proposal**. This is presented as a Powerpoint talk to all graduate faculty and student peers during the second or third term of residence. The student receives meaningful feedback on his/her Proposal during a Q and A session, and the graduate faculty assign a collective grade. The **Thesis Research** phase of the process involves back-and-forth interaction with the thesis supervisor as the research endeavor progresses. Commonly, preliminary thesis results are presented at professional Geology and Geophysics conferences. The student submits drafts of the Master's Thesis for review and critique, first by the thesis supervisor; later by the graduate thesis committee. Finally, essential results of the thesis are presented orally to student peers and all graduate faculty, and a formal thesis defense is conducted. Abundant constructive feedback is provided to the student at during these later stages, resulting in improvements to the final thesis document. Perhaps the best measure of student success is the high placement rate (>90%) of our MS graduates in Geoscience industry jobs or prestigious PhD programs.

WASC Senior College and University Commission

California State Polytechnic University, Pomona
Modified Inventory of Educational Effectiveness Indicators (IEEI)
AY 2017-2018

1	College	Science
	Department	Geological Sciences
	Degree Program	Geology MS
	Name of all available Options within the degree	None
2	Have formal program learning outcomes (PLOs) and student learning outcomes (SLOs) been developed and submitted to the Office of Academic Programs? Yes/No	Yes
	Website with PLOs and SLOs	Program Learning Objectives are published on the Department Website. http://www.cpp.edu/~sci/geological-sciences/docs/MastersMissionObjectivesOutcomes.pdf Individual Graduate Course learning outcomes are published at: http://www.cpp.edu/~sci/geological-sciences/docs/GraduateAndSeniorCourseDescriptionsSept2014.pdf
3	Has a Curriculum Map been developed and submitted to the Office of Academic Programs? Yes/No	Yes
	Where is this curriculum map published for quarters and semesters?	The curriculum map is published on the Department Website. http://www.cpp.edu/~sci/geological-sciences/docs/GeologyMSmatrixCoursesVsOutcomes.pdf
4	Other than GPA, what types of **direct evidence** are used to determine that graduates have achieved stated student learning outcome identified in #5 for the degree? (e.g., capstone course, portfolio review, licensure examination)? Note: Formative and summative assessment exceeds our expectations.	See Part 5 below
5	Provide an executive summary of results on how students are achieving at least one SLO (more than one SLO is exceeding our expectations) for the degree program. For undergraduate programs link the SLO evaluated to one of the WSCUC's core competencies (Critical Thinking, Information Literacy, Oral Communication, Written Communication or Quantitative Reasoning). Remember to identify which core competency this fits. For	Geology MS SLO #6: **"Write a Master's thesis document conforming to discipline standards"** links directly to the WASC core competencies: **Written Communication.** SLO#6 is directly assessed through: 1. Back-and-forth editing process between the student and faculty thesis supervisor; 2. Detailed review of the final draft document and written comments / suggestions by each member of the Master's thesis committee ; 3. Clarification of the ideas during oral defense; and 4. Library review and online publication of the finished product. The thesis committee agrees upon a collective grade for the thesis document. We find that the process of writing and defending a thesis is very valuable experience for the graduate student, and highly effective for providing meaningful feedback.

	programs that do not have an SLO that aligns to a Core Competency still provide direct evidence on student learning.	
6	What types of **indirect evidence** are used to determine that graduates have achieved stated outcomes for the degree? (e.g., student survey, employer survey, focus groups)?	• Advising efforts that include one-on-one advising of each MS student each quarter. New graduate contract worksheets developed during 2014-15 and refined in 2015-16 enable students to track student progress toward degree. Our personalized advising efforts allow faculty to make suggestions for efficient scheduling, and rectify academic performance problems. • Constructive discussions between MS thesis committee members and students during MS thesis proposals (GSC 600) and MS thesis defenses (GSC 696) • Regular lunchtime seminars that encourage interactions between Geology faculty and MS student cohorts Tracking of MS graduate placement in industry jobs or PhD programs. So far 100% of our MS graduates are gainfully employed or have moved on to very prestigious PhD institutions.
7	Provide at least one example (more than one example is exceeding our expectations) which summaries the results on how the indirect evidence was used to improve student learning?	We made several improvements have been made to the MS program functionality during 2015-18. These include new documents to spell out key deadlines, guidelines and policies. • Implementation of New Student Orientation session during first Fall meeting of GSC 501. Attended by all graduate faculty,, the new graduate student cohort, and continuing grad students this meeting outlines the program logistics and path to graduation, including Important Deadlines: http://www.cpp.edu/~sci/geological-sciences/docs/DeadlinesForGeologyMSstudentsSept2015.pdf • Revision of Graduate Contract worksheet: http://www.cpp.edu/~sci/geological-sciences/docs/GeologyGradContractWorksheetsAll.xlsx • Development and promotion of clear guidelines for completing the MS thesis: Master's Proposal Guidelines-- http://www.cpp.edu/~sci/geological-sciences/docs/GSC600ThesisProposalECOfinalJune2015.pdf Master's Thesis Guidelines and Policies— http://www.cpp.edu/~sci/geological-sciences/docs/GSC696MastersThesisGuidelinesAndPoliciesSept2015.pdf Although no formal assessment data has been tabulated and analyzed, we are pleased with our students' ability to meet the MS program learning outcomes. One important measure of the program success is that 5 out of 9 of our inaugural class graduated within two years (before September 2014); 17 additional students graduated during the 2014-18 academic years. The Geology MS program is rapidly growing and on track for continued success.
8	Provide one example (more than one example is exceeding our expectations) how the program is addressing student learning by using the **direct evidence** data to **close the loop** which provides the program a continuous improvement plan.	Our semester conversion process is an excellent example of program assessment. Geology faculty were involved in lengthy discussions about how to improve the Geology MS curriculum. We studied abundant evidence including: past student performance in specific quarter GSC classes; constraints on faculty time for teaching vs research; comparisons with other CSU and US Geology programs; trends in the academic discipline; consultations with alumni and industry stakeholders. Considering the specific expertize of our faculty cohort,

	Make sure this is linked to direct evidence. Examples include but are not limited: • Changes to curriculum by adding XYZ • Pedagogy changes within the program (adding supplemental instruction for DUF courses) • Faculty development on teaching • Changes to assessment tools	we devised a new Geology MS curriculum that will efficiently and effectively lead to student success (e.g., awarding the MS degree) in the semester system while maintaining high academic standards and preparing students for productive Geoscience careers.
9	Who interprets the evidence? What is the process? (Note if this is same as what your program submitted in your 2018 assessment plans, than just state SAME AS WHAT WAS SUMBITTED)	Program assessment is discussed in fall and spring meetings of the graduate faculty. Topics include: anecdotes of student successes and potential curricular roadblocks; progress to degree; maintenance of Geology Department teaching standards; scheduling issues; program revision for semester conversion. Geology faculty collectively develop new mechanisms to improve the MS program.

Note: If the degree program has a supplemental report, please include with IEEI as supporting material.