

Meaning of the Geology BS Degree	Responses
<p><b>This section is about the structure of the degree, its components and its expectations.</b></p>	<p>1. <i>The Geological Sciences Department offers a diverse and modern BS degree program with three Emphasis Areas (Geology; Geophysics / Earth Exploration; Environmental Resources) to produce graduates who understand the science behind active Earth processes and bring quantitative problem-solving skills to the table in an interdisciplinary work environment. Graduates of the CPP Geology program have broad capabilities and are ready to confront these new challenges as professional geologists or in post-graduate educational settings.</i></p>
<p>1. Describe the generic degree and what makes your degree at CPP distinct.</p>	<p>2. <i>See attached matrix linking University Core Values and Learning Outcomes to Geology BS Learning Objectives</i></p>
<p>2. Describe how the degree aligns with the university vision, values, and outcomes.</p>	<p>3. <b><i>Expectations for Entering Students</i></b>  <i>Freshmen applicants are expected to have general interests in the geosciences. Transfer applicants must have satisfied the lower division GE requirements. They should also have taken Principles of Geology lecture and lab that constitutes one of our core requirements. We recommend that transfers take a year of calculus and some chemistry before beginning at Cal Poly Pomona.</i></p>
<p>3. Describe your entering students' abilities and your graduates' culminating skills.</p>	<p><b><i>Culminating Skills</i></b>  <i>The Geology emphasis is strongly field-oriented and offers a hands-on, traditional, program focused on mineral resources and developing excellent field and mapping skills. The Geophysics/Earth Exploration emphasis takes a more global and quantitative approach to the Earth and Planetary Sciences, producing graduates who use modern technology to address another growth area in the Geosciences: natural hazard analysis and mitigation. The Environmental Resources emphasis, through its interdisciplinary coursework, addresses the important contemporary need for geoscientists able to tackle the challenges posed by the world's demand for mineral, energy and water resources in the context of environmental change.</i></p>
<p>4. Describe the curricular and co-curricular components that you have put into place to achieve your expectations.</p>	<p>4. <i>The Geology BS curriculum balances classroom theory, modern technology and laboratory application with field experiences that incorporate industry-standard equipment, and offers opportunities for faculty-mentored research. We have a strong record of obtaining state-of-the art equipment through faculty research grants. Students gain valuable and</i></p>

	<p><i>practical skills utilizing such equipment individually and in teams. Our applied approach to learning and career training is directed by faculty who can provide personal guidance specific to each student. Much department effort goes toward recruiting and retaining the highest quality faculty who are current in their field.</i></p>
Quality of the Degree	Responses
<p><b>This section is about the alignment of the degree program with the expectations.</b></p>	<p><i>5. Below we link specific Geology BS <b>core courses</b> to our seven learning outcomes for the degree. Expectations for achieving these outcomes, and corresponding course grades are described in the Expanded Course Outlines for individual courses.</i></p>
<p>5. Describe (don't just list) your learning outcomes, the levels that you have set for graduates, and how they align with your expectations.</p> <p>6. Describe how the curricular and co-curricular components of the program help students to meet the expectations and learning outcomes.</p>	<p><b>SL01)</b> Understand and implement various facets of the scientific method. <i>The scientific method is embedded in every one of the core courses for the Geology BS degree</i></p> <p><b>SL02)</b> Effectively communicate results of scientific investigations in written and oral format. <i>GSC 141L; GSC 145L; GSC 151L; GSC 350; GSC 410</i></p> <p><b>SL03)</b> Recognize common Earth materials, structures, and landforms, describe their properties, and determine their age relationships. <i>GSC 111; GSC 112; GSC 141L; GSC 151L; GSC 215/L; GSC 255L; GSC 323/L; GSC 333/L; GSC 491L;</i></p> <p><b>SL04)</b> Acquire geologic data in the laboratory or field using standard observational procedures and scientific equipment. <i>GSC 141L; GSC 151L; GSC 255L; GSC 300/L; GSC 307/L; GSC 333/L; GSC 360/L</i></p> <p><b>SL05)</b> Describe the interrelated processes operating in Earth's lithosphere, hydrosphere, atmosphere, and biosphere over different geologic time scales. <i>GSC 111; GSC 112; GSC 300/L; GSC 360/L</i></p> <p><b>SL06)</b> Use maps, cross sections, and other imagery to analyze and interpret spatial and temporal relationships displayed by Earth features or geologic data sets. <i>GSC 141L; GSC 151L; GSC 255L; GSC 307/L; GSC 333/L; GSC 350; 401/L; GSC 411/L;</i></p> <p><b>SL07)</b> Utilize quantitative reasoning, experiential judgment, and computer technology to assess data, draw conclusions, and solve problems. <i>GSC 307/L; GSC 333/L; GSC 360/L; GSC 401/L; GSC 411/L; GSC</i></p> <p><i>6. Learning outcomes are met through classroom theory, modern technology and laboratory application with field experiences that incorporate industry-standard equipment</i></p>

	<p><i>obtained through faculty research grants. Students gain valuable and practical skills utilizing such equipment individually and in teams. Faculty-mentored research projects provide additional capstone experiences. Our applied approach to learning and career training is directed by faculty who can provide personal guidance specific to each student.</i></p>
<p><b>Integrity of the Degree</b></p>	<p><b>Responses</b></p>
<p><b>This section is about the assurance that the degree is meeting the expectations.</b></p>	<p><i>7. Individual faculty members use observations analyzed through embedded exam questions, pre-test/post-test results, and rubrics applied to student presentations and homework sets to evaluate student achievement of learning outcomes. Improvements to our quarterly advising system also facilitate communication between faculty and students.</i></p>
<p>7. Describe the assessment that you have put into place to measure whether the curricular and co-curricular components are meeting their purposes.</p> <p>8. Describe the assessment that you have put into place to measure to what extent the program is achieving its expectations and learning outcomes at the desired levels.</p> <p>9. Describe the feedback that you collect, internally and externally, to support your assessment.</p>	<p><i>8. Integrity of the Geology BS program is gauged through a series of assessment tools. Those tools that have been especially informative include:</i></p> <ul style="list-style-type: none"> <li>• <i>Mapping of specific GSC courses against Program Learning Outcomes</i></li> <li>• <i>Development and piloting of rubrics for our GE Area B1 and B5 classes</i></li> <li>• <i>Development of rubrics for the senior thesis presentations (GSC 462) and other courses requiring student presentations (GSC 120, GSC 145L, GSC 300, GSC 304, GSC 321, GSC 335, GSC 350; GSC 410, GSC 444, GSC 450)</i></li> <li>• <i>Pre-test / Post-test analyses conducted in several classes</i></li> <li>• <i>Advising efforts that include one-on-one advising of each Geology major each quarter. New advising worksheets were developed in 2014-15 that enable students to track student progress toward degree. These advising efforts allow faculty to make suggestions for efficient scheduling, and rectify academic performance problems before they become untenable.</i></li> <li>• <i>Development of seminars focused on how to apply for internships and graduate school</i></li> <li>• <i>Tracking of BS graduate placement. The majority of our graduates are placed in industry jobs related to the geosciences. Approximately 10-20% continue on to graduate school, including some very prestigious institutions</i></li> <li>• <i>Constructive discussions among Geology faculty about our curricular goals in light of the semester conversion</i></li> </ul>

*9. Each faculty member analyses data yielded by various assessment tools to gauge student achievement and knowledge gaps that can be addressed in future course offerings. Feedback from employers that hire our BS graduates indicates that students perform at a high level in the workplace. Interactions with alumni at our annual reunion are also informative.*

*Additional evidence of our program success and integrity is contained in the various reports related to our Academic Program Review of 2010-11. Assessment by the External Reviewers, the Dean's comments and subsequent meetings with the Provost, Associate Provost and Science Dean were all positive. The Geology BS program is rapidly growing and on track for continued success.*

<b>B.S. in Geological Sciences</b>	<b>Program Outcomes</b> (posted at <a href="http://www.cpp.edu/~sci/geological-sciences/about/academic-goals.shtml">http://www.cpp.edu/~sci/geological-sciences/about/academic-goals.shtml</a> )						
<b>University Core Values and Learning Outcomes</b>	<b>General Science</b>		<b>Observation/Inquiry</b>			<b>Analysis/Interpretation</b>	
	<b>1. Understand and implement various facets of the scientific method.</b>	<b>2. Effectively communicate results of scientific investigations in written and oral format.</b>	<b>3. Recognize common Earth materials, structures, and landforms, describe their properties, and determine their age relationships.</b>	<b>4. Acquire geologic data in the laboratory or field using standard observational procedures and scientific equipment.</b>	<b>5. Describe the interrelated processes operating in Earth's lithosphere, hydrosphere, atmosphere, and biosphere over different geologic time scales.</b>	<b>6. Use maps, cross sections, and other imagery to analyze and interpret spatial and temporal relationships displayed by Earth features or geologic data sets.</b>	<b>7. Utilize quantitative reasoning, experiential judgment, and computer technology to assess data, draw conclusions, and solve problems.</b>
<b>Global Citizenship</b> to understand the responsibilities of being a global citizen and the role of civic engagement in fostering a democratic society		<b>X</b>			<b>X</b>		<b>X</b>
<b>Ethical Understanding</b> To understand and apply ethical considerations in professional, personal and social life		<b>X</b>					<b>X</b>
<b>Interpersonal Skills</b> to apply teamwork and leadership skills to achieve common goals in a diverse multicultural environment		<b>X</b>					<b>X</b>
<b>Communication Skills</b> to apply verbal, written, visual and listening skills to communicate persuasively and coherently to diverse audiences	<b>X</b>	<b>X</b>					<b>X</b>
<b>Critical Thinking</b> to think clearly and logically, analyze and interpret information, evaluate ideas, and draw inferences through reasoning	<b>X</b>				<b>X</b>	<b>X</b>	<b>X</b>
<b>Problem Solving</b> to identify, formulate, assess, investigate, evaluate and solve problems effectively and creatively	<b>X</b>		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>Quantitative Reasoning</b> to apply quantitative reasoning to understand, analyze and explain evidence	<b>X</b>	<b>X</b>			<b>X</b>	<b>X</b>	<b>X</b>
<b>Integrating and Transferring Learning</b> to make connections across disciplines and between current and new knowledge; and to apply their knowledge in professional and community life	<b>X</b>	<b>X</b>			<b>X</b>		<b>X</b>
<b>Lifelong Learning</b> to exercise Cal Poly Pomona's learn-by-doing approach in real-world situations, and as a basis for lifelong learning	<b>X</b>		<b>X</b>	<b>X</b>		<b>X</b>	<b>X</b>
<b>21st Century Literacies</b> to apply 21st century literacies including information, quantitative and scientific, to locate, evaluate, use and communicate among a wide variety of sources and tools	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>Liberal Learning</b> to demonstrate knowledge and appreciation of the physical and natural world, and of the development and legacies of			<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	

diverse world cultures							
<b>Intentional Learning</b> to employ self-knowledge of the social and cognitive factors influencing their learning, and engage in ongoing reflection and exploration for the purpose of personal development		<b>X</b>					<b>X</b>
<b>Disciplinary Learning</b> to apply fundamental information, concepts, theories and methods in their principal disciplines; and to successfully integrate, adapt and apply their disciplinary knowledge	<b>X</b>		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>Global Leaders</b> Global Citizenship; Ethical Understanding; Interpersonal Skills; Communication Skills		<b>X</b>			<b>X</b>		<b>X</b>
<b>Integrative Thinkers</b> Critical Thinking; Problem Solving; Quantitative Reasoning; Integrating and Transferring Learning	<b>X</b>	<b>X</b>			<b>X</b>		<b>X</b>
<b>Active Learners</b> Lifelong Learning; 21 <sup>st</sup> Century Literacies; Liberal Learning; Intentional Learning		<b>X</b>	<b>X</b>	<b>X</b>			
<b>Practitioners</b> Disciplinary Learning	<b>X</b>		<b>X</b>	<b>X</b>	<b>X</b>		<b>X</b>