

**Assessment Action Plan**  
***Department of Biological Sciences***

The Graduate Committee of the Department of Biological Sciences will develop an assessment plan that will assess student development, learning outcomes, and course content to identify programmatic deficiencies.

## **Graduate Student Learning Outcomes**

### *Department of Biological Sciences*

1. Students will demonstrate critical thinking through their ability to effectively search the scientific literature; read, understand and critically evaluate that literature; and draw appropriate conclusions from that literature.
2. Students will demonstrate acquisition of discipline-specific knowledge
3. Students will be able to design original experiments, or conduct observations, with appropriate controls that test alternative hypotheses.
4. Students will be able to collect experimental data using appropriate theoretical, laboratory or field techniques and/or instrumentation.
5. Students will be able to analyze and evaluate scientific data using appropriate statistical and other analytical tools (e.g., phylogenetic, bioinformatic, and/or mathematical software)
6. Students will be able to communicate science and particularly their own scientific discoveries through a variety of media, including oral communication (e.g., presentations, seminars), visual communication (e.g., graphs, figures, posters) and written communication (e.g., research papers, final thesis, grant proposal or project, as appropriate for their concentration).

## Curriculum Map

### Program Learning Outcomes

<b>Coursework</b>	<b>Course type</b>	<b>PLO1</b>	<b>PLO2</b>	<b>PLO3</b>	<b>PLO4</b>	<b>PLO5</b>	<b>PLO6</b>
Bio 220	Core	X	X	X	X	X	X
Bio 221A	CC	X	X	X	X	X	X
Bio 221B	CC	X	X	X	X	X	X
Bio 221C	CC	X	X	X	X	X	X
Bio 222	CC	X	X				
Bio 223	Elective	X	X	X		X	X
Bio 224	CC	X	X				
Bio 225	CC	X	X				
Bio 227	Elective	X	X				X
Bio 245	Elective	X	X	X		X	X
Bio 247	Elective	X	X				
Bio 260	Elective	X	X				
Bio 269	Elective	X	X				
Bio 273	Elective	X	X				
Bio 279	Elective	X	X				
Bio 282	CC	X	X				X
Bio 283	Elective	X	X				
Bio 285	Elective	X	X				
Bio 293	Elective	X	X	X	X	X	X
Bio 294	Core	X	X	X		X	X
Bio 297	Elective	X	X				
Bio 299	Core	X	X	X	X	X	X
Bio 500	Core	X	X	X	X	X	X
Bio 502	Core	X	X	X	X	X	X
Bio 633	Elective	X	X				

CC=Concentration Core

**Lines of Evidence for Assessing Graduate Program Learning Outcomes**

<b>Date</b>	<b>PLO</b>	<b>Direct Lines of Evidence</b>  (Example: Assignments in core courses; early writing assessment)	<b>Indirect Lines of Evidence</b>  (Mid-course assessments; Alumni Survey)	<b>Lead/Resources</b>  (Example: Faculty Advisors; Course Instructor; Department Chair)	<b>Evaluation Parameters &amp; Timeline:</b> Examples of timeline: Admission (A); Exit (E); On-going (O); Follow up with Alumni (F); Qualification for Culminating Experience (Q)	<b>Evaluation of each PLO based on direct lines of evidence</b>
	1	<i>Assignments in core courses</i>  <i>Completion of culminating experience</i>	<i>Mid-course assessment</i>  <i>Exit interview</i>  <i>Alumni Survey</i>	Faculty Advisors; Course Instructor	O, Q	
	2	<i>Assignments in core courses</i>  <i>Completion of culminating experience</i>	<i>Mid-course assessment</i>  <i>Exit interview</i>  <i>Alumni Survey</i>	Faculty Advisors; Course Instructor	O, Q	
	3	<i>Assignments in core courses</i>  <i>Completion of culminating experience</i>	<i>Mid-course assessment</i>  <i>Exit interview</i>  <i>Alumni Survey</i>	Faculty Advisors; Course Instructor	O, Q	
	4	<i>Assignments in core courses</i>  <i>Completion of culminating experience</i>	<i>Mid-course assessment</i>  <i>Exit interview</i>  <i>Alumni Survey</i>	Faculty Advisors; Course Instructor	O, Q	

	5	<i>Assignments in core courses (Bio 220, 221A &amp; B)</i>  <i>Completion of culminating experience</i>	<i>Mid-course assessment</i>  <i>Exit interview</i>  <i>Alumni Survey</i>	Faculty Advisors; Course Instructor	O, Q	
	6	<i>Assignments in core courses (Bio 220, 221A &amp; B)</i>  <i>Completion of culminating experience</i>	<i>Mid-course assessment</i>  <i>Exit interview</i>  <i>Alumni Survey</i>	Faculty Advisors; Course Instructor	O, Q	

## ANALYSIS AND CRITICAL THINKING RUBRIC

Performance Element	Advanced (5)	Proficient (3)	Beginning (1)	Score (5-0)
<b>Communication</b>	<ul style="list-style-type: none"> <li>Identifies the main idea or problem with numerous supporting details / examples which are organized logically and coherently.</li> </ul>	<ul style="list-style-type: none"> <li>Identifies the main idea or problem with some supporting details and examples in an organized manner.</li> </ul>	<ul style="list-style-type: none"> <li>Identifies the main idea or problem with few details or examples in a somewhat organized manner.</li> </ul>	
<b>Analysis</b>	<ul style="list-style-type: none"> <li>Uses specific inductive or deductive reasoning to make inferences regarding premises;</li> <li>addresses implications and consequences;</li> <li>identifies facts and information correctly.</li> </ul>	<ul style="list-style-type: none"> <li>Uses logical reasoning to make inferences regarding solutions;</li> <li>addresses implications and consequences;</li> <li>Identifies facts and relevant information correctly.</li> </ul>	<ul style="list-style-type: none"> <li>Uses superficial reasoning to make inferences regarding solutions;</li> <li>Shows some confusion regarding facts, opinions, and relevant, evidence, data, or information.</li> </ul>	
<b>Problem Solving</b>	<ul style="list-style-type: none"> <li>Thoroughly identifies and addresses key aspects of the problem,</li> <li>insightfully uses facts and relevant evidence from analysis to support and defend potentially valid solutions.</li> </ul>	<ul style="list-style-type: none"> <li>Identifies and addresses key aspects of the problem,</li> <li>uses facts and relevant evidence from analysis to develop potentially valid conclusions or solutions.</li> </ul>	<ul style="list-style-type: none"> <li>Identifies and addresses some aspects of the problem;</li> <li>develops possible conclusions or solutions using some inappropriate opinions and information from analysis.</li> </ul>	
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>Insightfully interprets data or information;</li> <li>identifies obvious as well as hidden assumptions,</li> <li>establishes credibility of sources on points other than authority alone,</li> <li>distinguishes appropriate arguments from extraneous elements;</li> <li>provides sufficient logical support.</li> </ul>	<ul style="list-style-type: none"> <li>Accurately interprets data or information;</li> <li>identifies obvious assumptions,</li> <li>establishes credibility of sources on points other than authority alone,</li> <li>distinguishes appropriate arguments from extraneous elements;</li> <li>provides sufficient logical support.</li> </ul>	<ul style="list-style-type: none"> <li>Makes some errors in data or information interpretation;</li> <li>makes arguments using weak evidence;</li> <li>exhibits some fallacies in reasoning;</li> <li>provides superficial support for conclusions or solutions.</li> </ul>	
<b>Synthesis</b>	<ul style="list-style-type: none"> <li>Insightfully relates concepts and ideas from multiple sources;</li> <li>uses new information to enhance chosen solution;</li> <li>recognizes missing information;</li> <li>correctly identifies potential effects of new information.</li> </ul>	<ul style="list-style-type: none"> <li>Accurately relates concepts and ideas from multiple sources;</li> <li>uses new information to enhance chosen solution;</li> <li>correctly identifies potential effects of new information.</li> </ul>	<ul style="list-style-type: none"> <li>Inaccurately or incompletely relates concepts and ideas from multiple sources;</li> <li>shallow determination of effect of new information on chosen solution.</li> </ul>	

## ORAL COMMUNICATION RUBRIC

	<b>Advanced</b> (5 points)	<b>Proficient</b> (3 points)	<b>Beginning</b> (1 points)	<b>Score</b> <b>5-0</b>
<b>Organization</b>	<ul style="list-style-type: none"> <li>Ideas are clearly organized, developed, and support a clear purpose.</li> <li>The introduction gets the attention of the audience</li> <li>Main points are clear and organized effectively.</li> <li>The conclusion is satisfying and relates back to introduction.</li> </ul>	<ul style="list-style-type: none"> <li>Ideas are organized relative to the purpose but clarity between is not strong and clear.</li> <li>Introduction has the basic mechanics but not engaging.</li> <li>Main points are present but lacking some in clarity or method of organization.</li> <li>Conclusion is appropriate but may not connect to all issues raised.</li> </ul>	<ul style="list-style-type: none"> <li>Main idea is evident, but the organizational structure is weak</li> <li>Ideas may not be clearly developed or flow smoothly.</li> <li>Purpose not clearly stated.</li> <li>Introduction may not be well developed.</li> <li>Transitions may be awkward.</li> <li>Supporting material may lack in development.</li> <li>The conclusion may need additional development.</li> </ul>	
<b>Topic Knowledge</b>	<ul style="list-style-type: none"> <li>Student has a clear grasp of information.</li> <li>Citations are introduced and attributed appropriately and accurately.</li> <li>Student demonstrates full knowledge of topic.</li> <li>Speaking outline or note cards are used for reference only.</li> </ul>	<ul style="list-style-type: none"> <li>Student has a partial grasp of the information.</li> <li>Citations are generally introduced and attributed appropriately.</li> <li>Student is at ease with expected answers to all questions but fails to elaborate.</li> <li>Over dependence on notes may be observed.</li> </ul>	<ul style="list-style-type: none"> <li>Student has a limited grasp of information.</li> <li>Citations not used properly or too few</li> <li>Has some difficulty answering questions about the subject.</li> <li>Presentation is read directly from note cards.</li> </ul>	
<b>Audience Adaptation</b>	<ul style="list-style-type: none"> <li>The presenter is able to effectively keep the audience engaged.</li> <li>Material is modified or clarified as needed given audience verbal and nonverbal feedback.</li> <li>Delivery style is modified as needed.</li> </ul>	<ul style="list-style-type: none"> <li>The presenter is able to keep the audience engaged most of the time.</li> <li>Generally, the speaker demonstrates audience awareness through nonverbal and verbal behaviors.</li> <li>Some effort to make the material relevant to audience needs and interests.</li> </ul>	<ul style="list-style-type: none"> <li>The presenter is not able to keep the audience engaged.</li> <li>Not aware of audience feedback</li> <li>No noticeable change in delivery based on obvious verbal or nonverbal feedback from the audience.</li> </ul>	
<b>Language Use</b>	<ul style="list-style-type: none"> <li>Language is familiar to the audience and appropriate for the setting.</li> <li>The presenter may "code-switch"</li> </ul>	<ul style="list-style-type: none"> <li>Language is appropriate. W</li> <li>Word choices are not particularly vivid or precise.</li> </ul>	<ul style="list-style-type: none"> <li>Language choices may be limited, peppered with slang or jargon, too complex, or too dull.</li> </ul>	

	(use a different language form) when appropriate. • Language choices are vivid and precise.		• Language is questionable or inappropriate for a particular audience, occasion, or setting. •	
<b>Delivery</b>	• The delivery is natural, confident, and enhances the message - posture, eye contact, smooth gestures, facial expressions, volume, pace, etc. indicate confidence, • The vocal tone and delivery style and clothing are consistent with the message. Articulation and pronunciation are clear. • All audience members can hear the presentation.	• The delivery generally seems effective – however, effective use of volume, eye contact, vocal control, etc. may not be consistent. • Vocal tone, facial expressions, and clothing and other nonverbal expressions do not detract significantly from the message, generally, articulation and pronunciation are clear. • Most audience members can hear the presentation.	• The delivery detracts from the message (eye contact may be very limited, presenter may tend to look at the floor, mumble, speak inaudibly, fidget, or read most of the speech. • The delivery may appear inconsistent with the message, articulation and pronunciation tend to be sloppy. • Audience members have difficulty hearing the presentation. • Nonfluencies (“ums, like, etc...”) are used excessively.	



## READING TECHNICAL PAPERS RUBRIC - Final

### Definition

Reading is "the process of simultaneously extracting and constructing meaning through interaction and involvement with written language" (Snow et al., 2002). (From [www.rand.org/pubs/research\\_briefs/RB8024/index1.html](http://www.rand.org/pubs/research_briefs/RB8024/index1.html))

	<b>Advanced</b> (5 points)	<b>Proficient</b> (3 points)	<b>Beginning</b> (1 points)	<b>Score</b> <b>5 - 0</b>
<b>Comprehension</b>	<ul style="list-style-type: none"> <li>Recognizes possible implications of the text for contexts, perspectives, or issues beyond the assigned task (e.g., might recognize broader issues at play, or might pose challenges to the author's message and presentation).</li> </ul>	<ul style="list-style-type: none"> <li>Uses the reading to draw more complex inferences about the author's message and attitude.</li> </ul>	<ul style="list-style-type: none"> <li>Uses vocabulary appropriately to paraphrase or summarize the information the text communicates.</li> </ul>	
<b>Value of reading contribution</b> <i>In the context of the assignment / course</i>	<ul style="list-style-type: none"> <li>Evaluates the scholarly significance and relevance within and beyond the discipline.</li> <li>Evaluates according to contributions and consequences.</li> </ul>	<ul style="list-style-type: none"> <li>Uses text in the context of scholarship to develop a foundation of disciplinary knowledge.</li> <li>Raises and explores important questions.</li> </ul>	<ul style="list-style-type: none"> <li>Approaches text in the context of assignments with the intention and expectation of finding right answers and facts and concepts to display for credit.</li> </ul>	
<b>Analysis</b> <i>Interacting with data and interpretations in parts and as a whole</i>	<ul style="list-style-type: none"> <li>Identifies relations among ideas in the text.</li> <li>Evaluate how ideas support an advanced understanding of the text as a whole.</li> </ul>	<ul style="list-style-type: none"> <li>Recognizes relations among ideas in different parts of a text.</li> <li>Evaluates effective and ineffective arguments.</li> <li>Can explain how these ideas contribute to a basic understanding of the text as a whole.</li> </ul>	<ul style="list-style-type: none"> <li>Identifies aspects of a text as needed to respond to questions posed in assigned tasks.</li> <li>Can outline the analysis used to reach texts conclusions</li> </ul>	
<b>Interpretation</b> <i>Making sense with texts as blueprints for meaning</i>	<ul style="list-style-type: none"> <li>Articulates an understanding of the multiple interpretive possibilities particular to a text.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrates that s/he can read with comprehension.</li> <li>Can frame the text's interpretation into the purpose of the reading.</li> </ul>	<ul style="list-style-type: none"> <li>Can identify basic purpose(s) for reading.</li> <li>Relies on an external authority for clarification on the applicability of the text.</li> </ul>	

## RESEARCH WRITING RUBRIC - FINAL

2005. Adapted from California State University ([http://www.calstate.edu/LS/1\\_rubric.doc](http://www.calstate.edu/LS/1_rubric.doc))

	<b>Advanced</b> (5 points)	<b>Proficient</b> (3 points)	<b>Beginning</b> (1 point)	<b>Score</b> (5-0)
<b>1. Determine the extent of the information</b>	<ul style="list-style-type: none"> <li>Formulates a research question or topic that is focused, complete and identifies key concepts.</li> <li>Identifies most or all relevant information tools in various potential formats.</li> </ul>	<ul style="list-style-type: none"> <li>Formulates a question that is mostly focused and clear.</li> <li>Identifies concepts related to the topic, and identifies some useful information tools to meet the information need.</li> </ul>	<ul style="list-style-type: none"> <li>Formulates a question that is not focused or clear.</li> <li>Identifies few concepts related to the topic.</li> <li>Identifies some useful information tools to meet the information need.</li> </ul>	
<b>2. Access the needed information effectively</b>	<ul style="list-style-type: none"> <li>Implements a clear and focused research strategy.</li> <li>Uses information tools effectively.</li> <li>Finds information that directly fulfills the information need.</li> </ul>	<ul style="list-style-type: none"> <li>Uses an appropriate research strategy.</li> <li>Solves / clarifies problems by finding a variety of relevant information resources.</li> </ul>	<ul style="list-style-type: none"> <li>Uses an appropriate research strategy.</li> <li>Student solves problems by finding an appropriate information resource.</li> <li>Information sources may not always be appropriate</li> </ul>	
<b>3. Evaluate information and its sources critically</b>	<ul style="list-style-type: none"> <li>Compares and evaluates multiple and diverse sources and viewpoints according to specific criteria appropriate for the discipline.</li> </ul>	<ul style="list-style-type: none"> <li>Examines information using broad criteria such as authority, credibility, relevance, timeliness, and accuracy</li> <li>Makes good judgments about what to keep and what to discard.</li> </ul>	<ul style="list-style-type: none"> <li>Student examines information using limited criteria</li> <li>Makes inconsistent decisions about what to keep and what to discard.</li> </ul>	
<b>4. Use information effectively to accomplish a specific purpose</b>	<ul style="list-style-type: none"> <li>Effectively synthesizes and integrates information from a variety of sources,</li> <li>Draws appropriate conclusions.</li> <li>Clearly communicates ideas to others.</li> </ul>	<ul style="list-style-type: none"> <li>Generally uses appropriate information and evidence from multiple sources to support their claims and conclusions.</li> </ul>	<ul style="list-style-type: none"> <li>Student uses appropriate (but limited) information and evidence to support their claims and conclusions.</li> </ul>	
<b>5. Use information ethically</b>	<ul style="list-style-type: none"> <li>Student consistently and accurately cites ideas and information of others.</li> </ul>	<ul style="list-style-type: none"> <li>Student usually cites ideas and information of others correctly</li> </ul>	<ul style="list-style-type: none"> <li>Student sometimes cites ideas and information of others correctly.</li> </ul>	

INFORMATION TOOLS - Most people think of information literacy as a set of skills requiring technical ability, or more simply, as "doing". True information literacy, however, involves both thinking and doing. Given the ever-expanding sea of information at our disposal, analysis of an information need, knowledge of resource types, evaluation of access tools, and interpretation of results are critical to successful information retrieval. We need to "know-how" but more importantly, we must first "know-why".