

## Student Learning Outcomes (SLOs) for Instruction Programs Phase I

### Program Outcomes Assessment Report

#### “Program/Degree/Certificate Description or Mission Statement & Identification of Outcome(s)”

<b>Date:</b>	10/11/11
<b>Name of Degree, Certificate, Program:</b>	Life Science

<b>Contact Person &amp; Others Involved in Process:</b>	<b>LEAD: SUSAN MOSS</b> <b>Others: Tom Morrell, Andrew Chien</b>
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<b>Mission Statement or Description of the Program, Degree or Certificate:</b>	The Life Science degree will provide a strong foundation of basic scientific principles and critical thinking skills. Course topics include cell structure and function, evolution, genetics, taxonomy, human anatomy and physiology, and ecology. These emphases will provide students with the knowledge and skills to further their education in the field and to succeed in a variety of science, allied health, or technological careers.
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#### Institutional Learning Outcomes Supported: Please check the ISLOs that are supported by your program:

<input checked="" type="checkbox"/> <b>ISLO1</b> = communication skills; <input checked="" type="checkbox"/> <b>ISLO2</b> = critical thinking skills; <input checked="" type="checkbox"/> <b>ISLO3</b> = personal responsibility;
<input type="checkbox"/> <b>ISLO4</b> = information literacy; <input type="checkbox"/> <b>ISLO5</b> = global awareness

Degree or Certificate Grid needs to also be submitted (blank Grid on final page – see SLO Coordinator for assistance. The SLO Coordinator can make a grid for your specific degree/certificate program – just contact her.

Has SLO Grid been completed? Yes  X  No \_\_\_\_\_ Is it Attached? Yes  X  No \_\_\_\_\_

Please write a couple of sentences describing what information the completed Grid provides. You may want to comment on ISLOs which are being covered well or not covered at all, changes to be made to outcomes or assessments, or, if possible, you may want to compare Grid to previous years.:

The matrix includes 22 courses. The average ISLO ratings are: Critical Thinking (3.5), Communication (2.5), Personal Responsibility (2.5), Information Literacy (2.5), and Global Awareness (2.2). These data suggest that the most important focus of the degree is critical thinking and that the other program outcomes are deemed slightly less important.

Please include the outcomes that have been designed for your courses.

Course Number	Outcomes
ANTH 100	1) Define the main goals and aims physical anthropology. 2) Demonstrate a measurable understanding of the Theory of Evolution by Natural Selection. 3) Illustrate a measurable understanding of Mendelian Inheritance Rules and biological variation based on the study of modern genetics. 4) Recognize anatomical changes in the evolutionary history of humankind based on the fossil record. 5) Explain biological and cultural diversity.
BIOL 120	1) Display oral communication effectiveness. 2) Display ability to show critical thinking on subject, answering short answers on exams. 3) Display ability to understand written and illustrated information on subject matter. 4) Display an understanding of global impact on and by <b>invertebrate</b> animals.
BIOL 122	1) Display oral communication effectiveness. 2) Display ability to show critical thinking on subject, answering short answers on exams.

	<ol style="list-style-type: none"> <li>3) Display ability to understand written and illustrated information on subject matter.</li> <li>4) Display an understanding of global impact on and by <b>vertebrate</b> animals.</li> </ol>
<b>BIOL 140</b>	<ol style="list-style-type: none"> <li>1) Identify an important issue in botany, conduct research via literature, interviews with experts and hands-on projects, and clearly communicate content learned about the project by writing a research paper.</li> <li>2) Identify an important issue in botany, conduct research via literature, interviews with experts and hands-on projects, and document the information sources utilized by citing references within a research paper and at the end, using a standard documentation style (e.g. MLA style).</li> <li>3) Use systems thinking to explain how a selected topic in botany interconnects with global botanical communities, ecosystems or human societies and cultures.</li> </ol>
<b>BIOL 142</b>	Not available
<b>BIOL 150</b>	<ol style="list-style-type: none"> <li>1) Answer exam questions that deal with population genetics.</li> <li>2) Show personal responsibility by turning in homework assignments in on time.</li> <li>3) Answer exam questions that deal with critical thinking problem solving.</li> </ol>
<b>BIOL 180</b>	<ol style="list-style-type: none"> <li>1) Write lab reports that demonstrate an understanding of the lab and the ability to draw conclusions based on data.</li> <li>2) Discuss primary research literature and understand how science is performed and described.</li> <li>3) Demonstrate the ability to think like a scientist by coming up with a valid experimental design.</li> <li>4) Demonstrate critical thinking skills on exam essay questions.</li> </ol>
<b>BIOL 182</b>	<ol style="list-style-type: none"> <li>1) Display critical thought related to conducting the process of science and reporting findings.</li> <li>2) Create a presentation that reports the findings of a project that incorporates the scientific process.</li> <li>3) Create a dichotomous key that establishes mastery of the process.</li> <li>4) Display and understanding of natural selection.</li> </ol>
<b>BIOL 200</b>	<ol style="list-style-type: none"> <li>1) Display critical thought related to key concepts in human anatomy and physiology.</li> <li>2) Identify the anatomy and display comprehension of the physiology of the dermis</li> <li>3) Describe the causes, symptoms and treatments of a human health issue.</li> <li>4) Demonstrate an understanding of the anatomy and physiology of skeletal muscles.</li> </ol>
<b>BIOL 202</b>	<ol style="list-style-type: none"> <li>1) Display effective oral communication skills related to topics in human anatomy &amp; physiology.</li> <li>2) Display critical thought related to key concepts in human anatomy and physiology using written forms of expression and examination.</li> <li>3) Display ability to read, comprehend, summarize and orally present research articles related to human anatomy &amp; physiology.</li> <li>4) Display an understanding of global human health issues.</li> </ol>
<b>BIOL 204</b>	<ol style="list-style-type: none"> <li>1) Display critical thought related to topics in human anatomy using written forms of expression and examination.</li> </ol>

	<ol style="list-style-type: none"> <li>2) Display knowledge of anatomy and dissection competency using cat specimens as subjects.</li> <li>3) Display critical thought related to topics in human anatomy as it applies to a global perspective.</li> <li>4) Demonstrate competency in communicating information related to the anatomy of the heart.</li> </ol>
<b>BIOL 206</b>	<ol style="list-style-type: none"> <li>1) Describe the physiology associated with a current global human health issue.</li> <li>2) Demonstrate an understanding of the physiology related to an electroencephalogram.</li> <li>3) Display critical thought associated with the physiology of functioning skeletal muscles during an exercise in personal responsibility.</li> <li>4) Display critical thought related to an aspect of human physiology presented during a clinical situation.</li> </ol>
<b>BIOL 220</b>	<ol style="list-style-type: none"> <li>1) Explain the basic principles of biology, which include but are not limited to: structure and functions of the cell, genetics and heredity, evolution and its contribution to the diversity of life, and the interaction of organisms with their environment.</li> <li>2) Apply their knowledge and critical thinking to explain biological scenarios.</li> <li>3) Practice the process of science in a laboratory setting by using standard equipment and techniques common to biology labs, testing hypotheses through experimentation and interpreting the experimental data.</li> <li>4) Fully participate in classroom and laboratory activities.</li> <li>5) Devise an efficient and accurate dichotomous key to aid in the identification of disease-causing bacteria.</li> </ol>
<b>AG 101</b>	Not available
<b>AG/ENVS 110</b>	<ol style="list-style-type: none"> <li>1) Use global (i.e. ecosystems) thinking to design and create a visual representation of a sustainable human settlement which functions on ecosystem principles, and fulfills the ethics of caring for the earth and caring for people.</li> <li>2) Identify an important issue in environmental science, conduct research via literature, interviews with experts and hands-on projects, and document the information sources utilized by citing references within a research paper and at the end, using a standard documentation style (e.g. MLA style).</li> <li>3) Identify an important issue in environmental science, conduct research via literature, interviews with experts and hands-on projects, and clearly communicate content learned about the project by writing a research paper.</li> </ol>
<b>CHEM 200</b>	<ol style="list-style-type: none"> <li>1) Students demonstrate ability to perform dimensional analysis calculations as they relate to problems involving percent composition and density.</li> <li>2) Students write chemical formulas, and name inorganic compounds.</li> <li>3) Students relate chemical equations and stoichiometry as they apply to the mole concept.</li> <li>4) Students identify the basic types of chemical reactions including precipitation, neutralization, and oxidation-reduction.</li> </ol>

	<ol style="list-style-type: none"> <li>Students demonstrate knowledge of atomic structure and quantum mechanics and apply these concepts to the study of periodic properties of the elements.</li> </ol>
<b>CHEM 202</b>	<ol style="list-style-type: none"> <li>Students examine and develop concepts of covalent bonding, orbital hybridization and molecular orbital theory.</li> <li>Students identify and perform organic addition and elimination reactions.</li> <li>Students compare and analyze Thermodynamics properties and differentiate between spontaneity and maximum useful work heat and Free energy.</li> <li>Students develop ideas of Chemical Kinetics from experiments using concentration dependence then determining rates and rate law.</li> <li>Students recognize oxidation-reduction reactions in electrolytic cells, sacrificial anodes, the use of the Nernst equation, and how to balancing red-ox reactions.</li> </ol>
<b>CHEM 204</b>	<ol style="list-style-type: none"> <li>Students demonstrate knowledge of covalent bonding and molecular geometry.</li> <li>Students analyze the structure, nomenclature, physical properties and synthesize alkanes and cycloalkanes.</li> <li>Students evaluate and measure the difference between organic acids and bases.</li> <li>Students demonstrate knowledge of stereochemistry and its effects on molecular properties.</li> <li>Students analyze the structure, nomenclature, physical properties and synthesize alkenes.</li> </ol>
<b>CHEM 206</b>	<ol style="list-style-type: none"> <li>Students analyze the structure, nomenclature, physical properties and synthesize aldehydes and ketones.</li> <li>Students analyze the structure, nomenclature, and physical properties and synthesize carboxylic acids.</li> <li>Students recognized, assess Condensation reactions and synthesize esters enolate anions and enamines in Aldol reactions.</li> <li>Students develop and recognize the concept of aromaticity by the analysis of Aromatic compounds.</li> <li>Students determine the structure, nomenclature, physical properties and synthesize amines.</li> </ol>
<b>GEOL 100</b>	<ol style="list-style-type: none"> <li>Determine geographic and geologic locations (globally) for currently active volcanoes and recent earthquake activity.</li> <li>Identify and analyze patterns associated with earthquake and volcano locations relative to plate tectonics.</li> <li>Investigate and interpret geologically active and hazardous areas on Earth relative to human populations.</li> </ol>
<b>GEOL 110</b>	<ol style="list-style-type: none"> <li>Determine relevant factors that would contribute to the potential for earthquake-related damages.</li> <li>Identify what constitutes high-, moderate-, or low-risk situations for each factor.</li> <li>Apply above assessments to four sites in an idealized county in California.</li> </ol>

<b>MATH 119</b>	<ol style="list-style-type: none"> <li>1) Identify, compare, and contrast two articles that include both descriptive and inferential statistics on the same research topic.</li> <li>2) Students will apply their knowledge of statistical inference to conduct formal significance tests concerning single populations.</li> <li>3) Students will demonstrate their knowledge of basic descriptive statistics.</li> <li>4) Students will apply techniques of linear modeling to explore the relationship between two numerical variables.</li> </ol>
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**Please identify at least one outcome and assessment method, and estimated date for the completion of Section II. Please keep in mind the Comprehensive Program Review Schedule.**

**Instructional Programs (degrees, certificates): You are asked to complete Course-level Outcomes & Assessments for the two and half years leading up to your Program Review due date, and then Program-level Outcomes can be assessed during your Program Review Fall Semester. Still, even if your Program Review isn't due this fall, you will want to make a plan to evaluate it with colleagues by your Program Review due date.**

**Outcome #1:**

Students will demonstrate an understanding of fundamental biological concepts and knowledge of the structure and function of living organisms.

Est. Completion Date: completion of next Comprehensive Program Review (2013)

Way(s) to assess: exams, laboratory practicals, laboratory exercises, class presentations, and/or homework assignments

**Outcome #2:**

Students will display competency with respect to the use of standard laboratory equipment and techniques commonly used in life science labs.

Est. Completion Date: completion of next Comprehensive Program Review (2013)

Way(s) to assess: exams, lab practicals, and/or laboratory exercises

**Outcome #3:**

Students will understand the process of scientific research and display critical thinking skills related to hypothesis development, experimentation and data interpretation.

Est. Completion Date: completion of next Comprehensive Program Review (2013)

Way(s) to assess: exams, lab practicals, laboratory exercises, class presentations, and/or assignments

**Outcome #4:**

Students should develop a foundation in biology strong enough to allow the successful completion of any attempted 200-level biology course(s).

Est. Completion Date: completion of next Comprehensive Program Review (2013)

Way(s) to assess: Comparison of class averages of those students who completed the BIOL 180-182 sequence prior to taking 200-level courses with the class averages of those students who only completed BIOL 100 before taking 200-level courses.

## Program Outcomes and Course Alignment Matrix for Imperial Valley College

Program: Life Science Associates Degree Completed on: 10/13/10

Prepared by : Daniel Gilison

Course	Communication	Critical Thinking	Personal Responsibility	Information Literacy	Global Awareness
18 units from					
ANTH 100	3	3	4	2	4
BIOL 120	3	2	2	3	4
BIOL 122	3	2	2	3	4
BIOL 140	3	2	2	3	4
BIOL 142	3	2	2	3	4
BIOL 150	1	4	3	0	3
BIOL 180	3	4	1	3	1
BIOL 182	2	4	1	3	1
BIOL 200	1	4	1	1	1
BIOL 202	1	4	1	1	1
BIOL 204	1	3	1	1	1
BIOL 206	1	4	1	1	1
BIOL 220	3	4	3	1	1
At least 6 units from:					
AG 101	4	4	4	3	2
AG/ENVS 110	4	4	4	4	3
CHEM 200	3	4	4	4	1
CHEM 202	3	4	4	4	1
CHEM 204	3	4	4	4	1
CHEM 206	3	4	4	4	1
GEOL 100	2	3	2	3	4
GEOL 110	2	3	2	3	4
MATH 119	4	4	2	2	1

**\*\*FIVE POINT KEY: Using this key, to receive a 3 or 4 the ISLO needs to be measured through the outcome and assessment.**

**4=**This is a STRONG focus of the course. Students are tested on it or must otherwise demonstrate their competence in this area.

**3=**This is a focus of the course that will be assessed.

**2=** This is a focus of the course, but is NOT assessed.

**1=**This is briefly introduced in the course, but not assessed.

**0=**This is not an area touched on in the course.