

**Biotechnology 3 & 4**  
**Scope & Sequence: Year 2**

Semester 1		Semester 2	
Quarter 1	Quarter 2	Quarter 3	Quarter 4
<b>Standards Addressed in all Units</b> – Technical Standards: 1.0-4.0, 6.0, 8.0 14.0; Professional Standards: 1.0-5.0			
<p>Additional Technical Standards: 5.0, 7.0 Additional Professional Standards: 8.0</p> <p><u>Unit 1</u></p> <p><b>Intro to Research</b></p> <ul style="list-style-type: none"> <li>Review experimental design.</li> <li>Review safety practices and standard operating procedures for laboratory.</li> <li>How to read a scientific paper (primary source document.)</li> </ul> <p>Additional Technical Standards: 9.0, 11.0</p> <p><u>Unit 2</u></p> <p><b>Advanced Microbiology</b></p> <ul style="list-style-type: none"> <li>Describe method of action and development process for antibiotic drugs.</li> <li>Identify cultured organisms</li> <li>Examine interactions between microorganisms.</li> <li>Optimize media and environment for growth of microorganisms.</li> </ul> <p><i>*Opportunity for Concurrent Enrollment in MCB102 at University of Arizona</i></p>	<p>Additional Technical Standards: 12.0-13.0</p> <p><u>Unit 3</u></p> <p><b>Advanced Nucleic Acid Techniques</b></p> <ul style="list-style-type: none"> <li>Design and optimize PCR primers and protocols.</li> <li>DNA Sequencing and Analysis</li> <li>Use DNA to determine relationships.</li> <li>Describe methods of gene regulation.</li> </ul>	<p>Additional Technical Standards: 10.0-11.0</p> <p><u>Unit 4</u></p> <p><b>Protein Analysis Techniques</b></p> <ul style="list-style-type: none"> <li>Extract Proteins</li> <li>Separate and Characterize Proteins</li> <li>Perform Protein Assays</li> <li>Describe ELISA &amp; Western Blots</li> </ul> <p>Additional Technical Standards: 8.0-14.0</p> <p><u>Unit 5</u></p> <p><b>Review of Technical Skills</b></p> <ul style="list-style-type: none"> <li>Nucleic Acid Techniques</li> <li>Protein Analysis Technique</li> <li>Microbiology Technique</li> <li>Scientific Measurement and Calculations</li> </ul> <p><i>*Technical Skills Assessment Industry Certification Testing</i></p>	<p>Additional Technical Standards: 5.0, 7.0 Additional Professional Standards: 8.0</p> <p><u>Unit 6</u></p> <p><b>Advanced Research</b></p> <ul style="list-style-type: none"> <li>Develop an independent research project proposal.</li> <li>Choose suitable organisms for your research.</li> <li>Describe Industry Standard Safety Practices.</li> <li>Review and analyze primary sources.</li> </ul> <p><i>*OSHA10 Completion</i></p>