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| <b>Program Name</b>                              | <b>Bioscience</b>   |
| <b>Program CIP Code</b>                          | 41.0100.00  |
| <b>Program Description and Coherent Sequence</b> | <p><b>Bioscience</b> program prepares individuals to apply scientific principals and technical skills in support of biologists and biotechnologists in research, industrial, and government settings. Includes instruction in fermentation technology, cell culturing, protein purification, biologic synthesis, assaying and testing, quality control, industrial microbiology, bioprocessing, chromatography and bio separation, genetic technology, laboratory and hazardous materials safety, and computer applications and test equipment operation and maintenance. The program is designed and delivered as a coherent sequence of experiences using technical instruction, academic foundations, experiential learning, supervised occupational experience and leadership and personal development through the Career and Technical Student Organization, Health Occupations Students of America (HOSA)</p> <p>The following describes the recommended Career Preparation courses developed from industry-validated skills for initial employment or continued related education. All the state-designated Bioscience standards are addressed in this instructional sequence.</p> <p><b>Introduction to Bioscience:</b> Students will learn about a variety of career options within the field of bioscience. Students will learn to maintain as safe lab work environment, standard operating procedures for laboratory work and demonstrate critical thinking and scientific problem solving skills, Students will have the opportunity to develop and demonstrate research and investigative skills as well as demonstrate procedures for quality control.</p> <p><b>Bioscience Technologies:</b> This course will allow students to expand their microbiology knowledge and demonstrate the use of bioinformatics resources and nucleic acid techniques. Students will job shadow professionals in bioscience professions and experience real world applications of bioscience methods and processes.</p> <p><b>Work-based Learning:</b> Students have the opportunity to participate in either a Bioscience Cooperative Education experience or an Internship.</p> |
| <b>Industry Validated Standards</b>              | <a href="http://www.azed.gov/career-technical-education/files/2015/05/technical-standards-bioscience-41010000.pdf">http://www.azed.gov/career-technical-education/files/2015/05/technical-standards-bioscience-41010000.pdf</a>   |
| <b>Specialized Equipment</b>                     | <ul style="list-style-type: none"> <li>• 80 freezer</li> <li>• UV/VIS spectrophotometer</li> </ul>  |

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|  | <ul style="list-style-type: none"> <li>• Gel boxes/power supplies</li> <li>• Micropipettes, thermal cycler</li> <li>• Vortex mixer, autoclave</li> <li>• UV-Illuminator</li> <li>• Incubators</li> <li>• Micro centrifuge</li> <li>• Laminar flow hood</li> <li>• Test tubes, flasks, autoclave, centrifuge, microscopes and chemicals</li> <li>• Chemical Fume Hood</li> <li>• Crosslinker, UV, CL-1000 115V</li> <li>• 16K Microcentrifuge</li> <li>• Hot Plate/Stirrer - MDL PC420</li> <li>• Vacuum/Pressure Pump</li> <li>• Bact-cinerator III Loop Sterilizer</li> <li>• 6 Place Table Centrifuge</li> <li>• Large Laminar Flow Hood</li> </ul> <p>Equipment List can be accessed at:<br/> <a href="http://www.azed.gov/career-technical-education/files/2011/11/equipment-list-bioscience-41010000.pdf">http://www.azed.gov/career-technical-education/files/2011/11/equipment-list-bioscience-41010000.pdf</a></p> |
| <b>Industry Recognized Certifications</b>  | <ul style="list-style-type: none"> <li>• Biotech-University of Florida's Center of Excellence for Regenerative Health Biotechnology (UF CERHB) <ul style="list-style-type: none"> <li>o Biotechnician Assistant Credential (BACE)</li> </ul> </li> </ul>   |
| <b>CTE End-Of- Program (EOP) Technical Skill Assessment (TSA) Y/N</b>                      | Yes  |
| <b>Current EOP TSA Pass Score</b>  | 60%  |
| <b>Participation in JTED Program Qualifies Students for These Employment Opportunities</b> | Research Lab Assistant<br>Clinical Lab Assistant<br>Laboratory Technician<br>Assistant lab manager<br>Chemical Lab Assistant   |

## SB1525 JTED Course and Program Requirements

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| <p><b>Requires students obtain passing score of 60% on assessment</b><br/>15-391(3)(b) Page 1/20-24 &amp; 15-391(5)(b) Page 2/1-6</p>   | <p>Yes.<br/>Bioscience Technical Skill Assessment has a 60% passing score.<br/>Biotechnician Assistant Credential (BACE) has a required passing score of 80%.</p>   |
| <p><b>Not a Course Required under Minimum Course of Study including Honors</b> 15-391(3)(d) Page 1/27-29</p>  | <p>No.<br/>The bioscience program is a separate course from the biology courses or other lab science that is required for graduation.</p>   |
| <p><b>Majority of Instructional Time in Lab / Field / Work Based Learning Environment</b><br/>15-391(3)(e) Page 1/30-32 and</p> <p><b>Requires CTSO Participation</b><br/>15-391(5)(d) Page 2/10-13</p> | <p>Yes.<br/>A majority of the instruction for Bioscience classes is taught in a lab setting and lab equipment is required for the Bioscience courses. Bioscience courses perform more advance research experiments. The equipment and supplies for these experiments require additional funding.</p> <p>Yes. HOSA is the CTSO for the Bioscience programs.</p>  |
| <p><b>Demonstrated Need for Extra Funding for a course</b> 15-391(3)(f) Page 1/33-34</p>  | <p>Yes.<br/>Lab equipment is required for the all Bioscience courses. Bioscience courses perform more advance research experiments. The equipment and supplies for these experiments require additional funding.<br/>(e.g., Restriction Enzymes, Cloning Vectors, PCR reagents, Antibodies and DNA ladder)</p>  |
| <p><b>Specialized Equipment Exceeds Cost of Standard Course</b><br/>15-391(3)(g) Page 1/35-36 and 15-391(5)(c) Page 2/7-9</p>   | <p>Yes.<br/>Lab equipment is required for the all Bioscience courses includes, but not limited to:</p> <ul style="list-style-type: none"> <li>• 80 freezer</li> <li>• UV/VIS spectrophotometer</li> <li>• Gel boxes/power supplies</li> <li>• micropipettes, thermal cycler</li> <li>• Vortex mixer, autoclave</li> <li>• UV-Illuminator</li> <li>• Incubators</li> <li>• Micro centrifuge</li> <li>• Laminar flow hood</li> <li>• Test tubes, flasks, autoclave, centrifuge, microscopes and chemicals</li> </ul> <p>Equipment List:<br/><a href="http://www.azed.gov/career-technical-education/files/2011/11/equipment-list-bioscience-41010000.pdf">http://www.azed.gov/career-technical-education/files/2011/11/equipment-list-bioscience-41010000.pdf</a></p> |

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| <p><b>Alignment through Curriculum, Instructional Model and Courses Sequence</b> 15-391(5)(e)<br/>Page 2/15-18</p>   | <p>Yes.<br/>State established course sequence for the Bioscience Program Consists of 2 Carnegie Units of instruction with the option of an additional Carnegie Unit Internship or Cooperative Education.</p>   |
| <p><b>Defined Pathway to Career and Postsecondary Ed in Specific Vocation or Industry</b> 15-391(5)(f)<br/>Page 2/19-21</p>  | <p>Yes.<br/>Certification level – Biotechnician Assistant<br/>Certification level – Clinical Lab Assistant<br/>Associate level – Biotechnician<br/>Bachelor’s Degree – Bioscience fields</p>   |
| <p><b>Fills High Need Vocation or Industry as Determined by CTE/ADE</b> 15-391(5)(j)<br/>Page 2/30-31</p>  | <p>Yes, from 2002-2014 Arizona Bioscience jobs increased by 49%, adding more than 36,700 jobs for a total of 110,410. The In comparison, during this same time span, there was a 13.7% gain in posted Bioscience jobs in the U.S. as a whole. Bioscience workers in Arizona earn an average annual salary of \$61,823, compared to \$46,514 for the state’s private sector as a whole. From 2002 to 2014, Bioscience salaries increased 50%. <a href="http://www.flinn.org/bioscience/arizonas-bioscience-roadmap/data/">http://www.flinn.org/bioscience/arizonas-bioscience-roadmap/data/</a></p> |
| <p><b>Requires a Single or Stackable Credential or a Skill that allows a student to obtain work</b> 15-391(5)(k) Page 2/32-35</p>  | <ul style="list-style-type: none"> <li>• Biotility-University of Florida’s Center of Excellence for Regenerative Health Biotechnology (UF CERHB) <ul style="list-style-type: none"> <li>◦ Biotechnician Assistant Credential (BACE)</li> </ul> </li> </ul> <p>The credential is currently recognized by the following industries: Monsanto, Bayer, Delta Pine, ALARC, USDA</p>   |
| <p><b>Leads to certification or licensure verified by that vocation or industry that qualifies student for employment which the student would not otherwise qualify.</b> 15-391(5)(l) Page 2/36-39</p>   | <ul style="list-style-type: none"> <li>• Biotility-University of Florida’s Center of Excellence for Regenerative Health Biotechnology (UF CERHB) <ul style="list-style-type: none"> <li>◦ Biotechnician Assistant Credential (BACE)</li> </ul> </li> </ul> <p>The credential is currently recognized by the following industries: Monsanto, Bayer, Delta Pine, ALARC, USDA</p>   |
| <p><b>If no certification or licensure is accepted by vocation or industry, completion of program must qualify student for employment for which student would not otherwise qualify without completing JTED program.</b> 15-391(5)(l) Page 2/39-43</p> | <p>Certification is available</p>  |

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| <p><b>Requires instruction and instructional materials substantially different from and exceed scope of standard instruction and include skills, competencies and knowledge to be successful in JTED program vocation or industry.</b><br/>15-391(5)(m) Page 2/44-45 and 3/1-3</p> | <p>Yes, instructional materials as well as, lab equipment is required for the all Bioscience courses. Bioscience courses perform more advance research experiments. The curriculum, equipment and supplies for these experiments require more additional funding.</p>   |
| <p><b>Industry provided financial or technical support.</b> 15-391(5)(n)<br/>Page 3/4-8</p>  | <p>Yes, Bioscience business and industry support for the Bioscience program includes but is not limited to:</p> <ul style="list-style-type: none"> <li>• Bioscience professionals serve on the Bioscience Technical Skill Standards Development and Validation Committee</li> <li>• Provide work-based learning opportunities inclusive of job shadowing, cooperative education experiences, internships</li> <li>• Provide field experiences and facility tours</li> <li>• Professionals serve as guest speakers on specific bioscience topics and opportunities,</li> <li>• Serve on both state and local advisory boards for bioscience programs</li> <li>• Professional development opportunities for teachers</li> </ul> |
| <p><b>Demonstrated need for extra funding in order to provide JTED program</b> 15-391(5)(o) Page 3/9-11</p>  | <p>Yes, lab equipment is required for the all Bioscience courses. Bioscience courses perform more advance research experiments. The equipment and supplies for these experiments require more additional funding.</p>   |

| <b>Eligibility</b>                     |   | <b>Yes</b> | <b>No</b> |
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| JTED                                   | The <b>Bioscience</b> program meets the requirements for <b><u>JTED</u></b> compliance and eligibility  | x          |           |
| CTE Federal Perkins and State Priority | The <b>Bioscience</b> program meets the requirements for <b><u>Perkins</u></b> and is eligible to generate <b><u>CTE State Priority funding</u></b> . | x          |           |