

**PROGRAM APPROVAL APPLICATION**  
**NEW or SUBSTANTIAL CHANGE or LOCALLY APPROVED**  
**(This application may not exceed 3 pages)**

**Fill In Form**

Biotechnology Level IIIA: Laboratory Technician  
 Certificate

Fall 2017

Proposed Program Title

Projected Program Start Date

Fullerton College

North Orange County Community College District

College

District

**Contact Information**

Doug Benoit

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Voting Member

Title

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Phone Number

Email

**Goal(s) of Program (Check all that apply):**

Career Technical Education (CTE)

Transfer

Other

**Type of Program (Check all that apply):**

Certificate of Achievement 12-17 (or 17-27 quarter) units

Certificate of Achievement 18+ semester (or 27+ quarter) units

Associate of Science Degree

Associate of Arts Degree

**Reason for Approval Request (Check One):**

New Program

Substantial Change

Locally Approved

**Program Information**

0430.00

Recommended [Taxonomy of Program \(TOP\) Code](#)

Units for Major-Degree

Total Units for Degree

32-40

Required Units-Certificate

**1. Insert the description of the program as it will appear in the catalog. (See PCAH pp. 142 and 170)**

The Biotechnology Level IIIA: Laboratory Technician Certificate is an option for the third certificate of the Biotechnology series. This certificate is designed for students who wish to obtain the skills required to gain employment in bioscience and biotechnology-influenced laboratories. Upon completion of this certificate program, students will be eligible to obtain employment as laboratory assistants, biomanufacturing technicians, or bioscience research and development technicians. The Biotechnology Level IIIA Certificate requires the completion of Level II (19-24 units) plus 6 units in required courses. An additional two courses (7-10 units) must be chosen from the restricted electives listed below. A grade of C or above must be earned for each of the courses.

**2. Provide a brief rationale for the program.**

Fullerton College and our collaborators met with a biotechnology advisory committee in June 2012 which recommended developing a stackable certificate that would provide new students and incumbent workers with skills to enter and advance in this growing industry. Since that meeting, all four community colleges have worked together to research and plan for the implementation of such a certificate. The certificate will be comprised of courses intended to develop and ensure proficiency in specific lab-based skills as well as more traditional basic biology and chemistry courses. We have proceeded in developing this program with the support of colleagues at Santiago Canyon College, Santa Ana College, Irvine Valley College and Wendie Johnston, director of the Pasadena City College LA/OC Biotechnology Economic Workforce Development Program.

The major goal of the stackable Biotechnology certificate series is to provide students with information and skills which will provide employment and advancement opportunities in the biotechnology sector, which includes many industries from food processing to research and development to medical device manufacturing. There are three tiers to the stackable certificates. The first level provides an overview of the industry, basic laboratory skills and related theory. The second level focuses on protein-related work (including Biomanufacturing) and quality control. The third level provides training in the booming field of nucleic acids, but also allow the student flexibility in choosing courses that align best with their interests and opportunities in the industry.

**3. Summarize the Labor Market Information (LMI) and employment outlook (including citation for the source of the data) for students exiting the program. (See PCAH pp. 85-88, 136, 147, 148, 165, 168, and 176)**

The Los Angeles/Orange region is the third largest biotechnology hub in the state. The top titles for job postings in 2015 were for 924 **laboratory technicians** and **516 laboratory assistants**, out of nearly 9000 job postings. Middle-skill biotechnology occupations are projected to undergo 8% growth rate by 2020. More than 1600 job openings, with 360 per year, are expected through 2020. The average median hourly wage is about \$20, or \$41,000 annual salary.<sup>(A)</sup>

The skills acquired by students completing this program will enable them to enter a large number of fields. Our interaction with industry indicates that they would hire certified individuals with skills over an individual with a B.S. without the skill-based training. The October 2014 report titled "Supply and Demand Analysis: Life Sciences and Biotech Middle Skills Workforce in California" by the California Community College's Centers of Excellence for Labor Market Research and the Life Sciences/Biotech Initiative analyzed the labor market for bioscience technicians who do not possess a bachelor's degree. The LA/Orange/Ventura region is projected to have 1383 new job openings (with 276 annually) between 2013-2018. Based on online postings in California for the top six related jobs, 25% of the advertisements were placed in LA/Orange County. Furthermore, in the Los Angeles region (Los Angeles, Orange and Ventura counties) the supply of workforce ready students is not currently meeting demand for projected job openings. The shortage of students supplied to the regional labor market may be as many as 245 per year.<sup>(B)</sup>

Given the labor shortage across the region, projected growth in our local catchment area, and high-wage opportunities, Fullerton College proposes to bolster the STEM workforce by offering certificates in biotechnology.

**Sources:**

- A. Middle-skill Biotechnology Occupations in Los Angeles and Orange Counties (April 2016), by the LA/OC Centers of Excellence for Labor Market Research, accessed on July 21, 2016.
- B. Supply and Demand Analysis: Life Sciences and Biotech Middle Skills Workforce in California, (October 2014), [http://www.calbiotechcareers.org/wp-content/uploads/2014/11/LS-Biotech-Middle-Skills-Jobs-in-CA\\_Report\\_Oct-2014.pdf](http://www.calbiotechcareers.org/wp-content/uploads/2014/11/LS-Biotech-Middle-Skills-Jobs-in-CA_Report_Oct-2014.pdf), accessed on May 1, 2016.

**4. List similar programs at other colleges in the Los Angeles and Orange County Region which may be adversely impacted. (There is space for 10 listings, if you need more, please contact [laocrc@sccollege.edu](mailto:laocrc@sccollege.edu))**

College	Program	Who You Contacted	Outcome
Santiago Canyon College	Biotechnology A.S. and Certificate	Denise Foley, Ph.D.	Supports
Santa Ana College	Biotechnology Technician Certificate	Kathleen Takahashi, Ph.D.	Supports
Irvine Valley College	Biotechnology Certificate	Emalee Mackenzie	Supports
Pasadena City College	Biological Technology, Lab Assistant Certificates	Pamela Eversole-Cire, Ph.D.	Supports
Citrus College	Biotechnology A.S., Biomanufacturing Certificate	Barbara Juncosa, Ph.D.	Supports

**5. List all courses required for program completion, including core requirements, restricted electives and prerequisites. (There is space for 20 listings, if you need more, please contact [laocrc@sccollege.edu](mailto:laocrc@sccollege.edu)). (See PCAH pp. 143 and 171)**

Courses	Course Number	Course Title	Units
Required Course	BIOL 190	Introduction to Biotechnology	3
Required Course	BIOL 190L	Introduction to Biotechnology Lab	1
Required Course	BIOL 191	Biotechnology A: Basic Laboratory Skills	4
Required Course	BIOL 192	Biotechnology B: Protein	4
Required Course	BIOL 193	Biotechnology C: Molecular Biology	4
Required Course	BIOL 194	Quality and Regulatory Compliance in the Biosciences	2
Required Course	BIOL 196	Tissue Culture Methods	2
Required Course	CHEM 101 OR CHEM 107 OR Assessment	Chemistry for Allied Health Science OR Preparation for General Chemistry OR Chemistry Assessment (minimum 80%)	0/5/5
Required Course	CHEM 201 OR CHEM 111A	Biochemistry for Allied Health Science OR General Chemistry I	5
Restrictive Electives (7-10 units)	BIOL 109	Genetics and Biotechnology in Society	3
Restrictive Electives (7-10 units)	BIOL 272	Cell and Molecular Biology	4
Restrictive Electives (7-10 units)	MICR 220	Medical Microbiology	4
Restrictive Electives (7-10 units)	MICR 262	General Microbiology	5
Restrictive Electives (7-10 units)	CHEM 111B	General Chemistry II	5

**6. Include any other information you would like to share.**