

# Bakersfield College

## Program Outline Report

### Program Basics

<b>Program Title:</b>	Research Laboratory Technology Associate of Science
<b>Program Status:</b>	In development
<b>Department:</b>	Chemistry
<b>Award Type:</b>	A.A. Degree for Transfer (Credit)
<b>Program Description</b>	This program will provide a foundation in science theory and practice for students to later receive training leading to technician careers in chemical, biological, and environmental testing and compliance; and to prepare students for emerging opportunities in sustainable energy careers. The program will accomplish this by serving as the first two years of the Baccalaureate Degree in Research Laboratory Technology which prepares students to work with modern qualitative and quantitative sample analyses; "good lab practice" and laboratory maintenance; documentation skills for OSHA and other laboratory regulations and standards; and computer systems for program management and reporting. To Achieve the Associate of Science: upon completion of graduation requirements and the required degree courses with at least a 'C or P' grade in each course, the student will be awarded an Associate of Science degree.
<b>Control Number:</b>	No value
<b>Credential ID:</b>	No value
<b>Transferability:</b>	Transferable to both UC and CSU
<b>Program TOP Code (SP01) :</b>	0955.00
<b>Program TOP Code (SP01) :</b>	Laboratory Science Technology
<b>Student Program Award (SP02) :</b>	Associate of Science (A.S.) degree
<b>Maximum Credits:</b>	60
<b>Minimum Credits:</b>	60
<b>Curriculum Committee Approval Date:</b>	09/07/2022
<b>Board of Trustees Approval Date:</b>	09/08/2022
<b>External Review Approval Date:</b>	07/01/2023

### Proposal Details

<b>Proposal Start:</b>	Fall 2022
<b>Rationale for Non-Fall Start:</b>	The coursework in this program has overlap with associate degrees for transfer in Biology, Chemistry, Environmental Science, and Geology. We anticipate being approved to offer a Bachelor's Degree in Research Laboratory Technology from the state of California. Students currently in the STEM Pathway degrees listed above may be able to switch to this associate

degree and apply for graduation and subsequent admission to the bachelor program as soon as this spring.

**Program Justification:**

The program is a pathway into the Bachelor's Degree in Research Laboratory Technology which has been submitted to state for approval.

**Submission Rationale**

- New Program

**Program Requirements**

**Core courses (Total 27-28)**

**Complete all of the following**

**Required Core (Total 24)**

**Complete all of the following**

CHEMB1A - General Chemistry I	5
CHEMB1B - General Chemistry and Chemical Analysis	5
CHEMB30A - Organic Chemistry for Science Majors, I	5
MATHB6A - Analytic Geometry/Calculus I	4
BIOLB3B - General Biology II	5

**Select one course from the following (Total 3-4)**

**Complete the following number of credits: 3-4**

BIOLB8 - Introduction to Environmental Science	3
ENERB22 - Energy Science	4
OSRMB12 - Occupational Health	3
OSRMB20 - Environmental Health and Hazardous Materials	3

**Recommended Sequences**

**New Sequence**

**Term 1 (Total 15-16)**

<b>Required Core</b> CHEMB1A - General Chemistry I	5
<b>Required Core</b> MATHB6A - Analytic Geometry/Calculus I	4

**Group 1A: English Composition (Total 3-4)****Take one of the following**

ENGLB1A - Expository Composition	3
ENGLB1AL - Expository Composition with Supplemental Instruction	3.5
EMLSB1A - Expository Composition	4

**Group 3A: Arts (Total 3)****Take one of the following**

MUSCB22 - Music Appreciation	3
ARTB35 - Survey of Western Art I	3
ARTB1 - Art Appreciation	3
ARTB4 - Two Dimensional Design	3
ARTB2 - Drawing I	3
ARTB36 - Survey of Western Art II	3
ARTB37 - Survey of Art - Latin America	3
MUSCB2 - Basic Elements of Music	3
MUSCB21B - History of Music	3
MUSCB4A - Elementary Theory	3
MUSCB4B - Elementary Theory	3
MUSCB21A - History of Music	3
THEAB31 - Introduction to Film Studies	3
MUSCB23 - Appreciation of Jazz	3
THEAB12A - Introduction to Shakespeare	3
MUSCB27 - History of Rock and Roll	3
THEAB20 - Introduction to Theatre	3
THEAB32 - Contemporary Film Studies	3
ARTB38 - Survey of Art – Asian Art	3

**Term 2 (Total 13)**

**Required Core** CHEMB1B - General Chemistry and Chemical Analysis 5

**Required Core** BIOLB3B - General Biology II 5

**Group 3B: Humanities (Total 3)****Take one of the following**

ENGLB21 - African-American Literature	3
ENGLB24 - Latino/a Literature	3
HISTB20A - The African American in the United States - to 1877	3
HISTB20B - The African American in the United States - Since 1865	3
HISTB30A - Early Chicano History - pre 1848	3
HISTB30B - History of Chicanos in the Southwest - Since 1848	3
HISTB36 - History of Native American Indians	3

**Term 3 (Total 14-16)**

**Required Core** CHEMB30A - Organic Chemistry for Science Majors, I 5

**Group 1B: Critical Thinking (Total 3-4)****Take one of the following**

ENGLB2 - Adv Comp and Critical Thinking	4
ENGLB3 - Argumentative Writing and Critical Thinking Through Literature	4
PHILB9 - Critical Thinking and Advanced Composition	3
HISTB9 - Historical Methods: Critical Thinking & Writing in History	3
COMMB15 - Argumentation and Rhetoric	3

**Area 4 -Social and Behavioral Sciences: Take three courses from at least two disciplines (Total 3-4)****Take one of the following**

ADMJB40 - Law and Democracy	3
ANTHB2 - Intro to Cultural Anthropology	3
ANTHB3 - Introduction to Archaeology	3
ANTHB5 - Native Peoples of North America	3
CHDVB21 - Child Growth and Development: Birth Through Adolescence	3
COMMB6 - Intercultural Communication	3
ECONB1 - Principles of Economics-Micro	3
ECONB2 - Principles of Economics-Macro	3
HISTB1 - World History to 1500	3
HISTB2 - History of World (Since 1650)	3
HISTB4A - European Civilization -pre 1650	3
HISTB4B - European Civilization- Post 1600	3
HISTB15 - Civilizations of the Middle East- Since 500 C.E.	3
HISTB17A - United States History to 1877	3
HISTB17B - United States History from 1865	3
HISTB20A - The African American in the United States - to 1877	3
HISTB18 - History of California	3
HISTB20B - The African American in the United States - Since 1865	3
HISTB25 - Intro to Women in Amer History	3
HISTB30A - Early Chicano History - pre 1848	3
HISTB30B - History of Chicanos in the Southwest - Since 1848	3
HISTB33 - Latin American History	3
HISTB36 - History of Native American Indians	3
JRNLB1 - Media and Society	3
POLSB1 - American Government: National, State and Local	3
POLSB2 - Comparative Government	3

POLSB3 - International Politics	3
POLSB16 - Vital Political Problems	3
PSYCB1A - General Psychology	3
PSYCB6 - Research Methods for the Behavioral and Social Sciences	4
PSYCB20 - Social Psychology	3
PSYCB33 - Psych of Person/Soc Adjustmnt	3
PSYCB40 - Intro to Lifespan Psychology	3
SOCIB1 - Introduction to Sociology	3
SOCIB2 - Problems of Modern Society	3
SOCIB20 - Social Psychology	3
SOCIB28 - Introduction to Gender	3
SOCIB36 - Sociology of the Chicano	3
SOCIB45 - Minority Relations	3
AGBSB2 - Agricultural Economics	3
CHDVB42 - Child, Family and Community	3
EDUCB8 - Sociocultural Foundations of Education	3
GEOGB2 - Human Geography	3
GEOGB5 - World Regional Geography	3
HISTB9 - Historical Methods: Critical Thinking & Writing in History	3
POLSB4 - Intro to Political Theory	3
PBHSB20 - Introduction to Public Health	3
PBHSB21 - Contemporary Health Concerns	3
PBHSB22 - Drugs, Health and Society	3
<b>Combination 2</b> HISTB17A - United States History to 1877	3

**Term 4 (Total 9-11)****Select one course from the following (Total 3-4)****Take one of the following**

BIOLB8 - Introduction to Environmental Science	3
ENERB22 - Energy Science	4
OSRMB12 - Occupational Health	3
OSRMB20 - Environmental Health and Hazardous Materials	3

**Area 4 -Social and Behavioral Sciences: Take three courses from at least two disciplines (Total 3-4)****Take one of the following**

ADMJB40 - Law and Democracy	3
ANTHB2 - Intro to Cultural Anthropology	3
ANTHB3 - Introduction to Archaeology	3
ANTHB5 - Native Peoples of North America	3
CHDVB21 - Child Growth and Development: Birth Through Adolescence	3

COMMB6 - Intercultural Communication	3
ECONB1 - Principles of Economics-Micro	3
ECONB2 - Principles of Economics-Macro	3
HISTB1 - World History to 1500	3
HISTB2 - History of World (Since 1650)	3
HISTB4A - European Civilization -pre 1650	3
HISTB4B - European Civilization- Post 1600	3
HISTB15 - Civilizations of the Middle East- Since 500 C.E.	3
HISTB17A - United States History to 1877	3
HISTB17B - United States History from 1865	3
HISTB20A - The African American in the United States - to 1877	3
HISTB18 - History of California	3
HISTB20B - The African American in the United States - Since 1865	3
HISTB25 - Intro to Women in Amer History	3
HISTB30A - Early Chicano History - pre 1848	3
HISTB30B - History of Chicanos in the Southwest - Since 1848	3
HISTB33 - Latin American History	3
HISTB36 - History of Native American Indians	3
JRNLB1 - Media and Society	3
POLSB1 - American Government: National, State and Local	3
POLSB2 - Comparative Government	3
POLSB3 - International Politics	3
POLSB16 - Vital Political Problems	3
PSYCB1A - General Psychology	3
PSYCB6 - Research Methods for the Behavioral and Social Sciences	4
PSYCB20 - Social Psychology	3
PSYCB33 - Psych of Personl/Soc Adjustmnt	3
PSYCB40 - Intro to Lifespan Psychology	3
SOCIB1 - Introduction to Sociology	3
SOCIB2 - Problems of Modern Society	3
SOCIB20 - Social Psychology	3
SOCIB28 - Introduction to Gender	3
SOCIB36 - Sociology of the Chicano	3
SOCIB45 - Minority Relations	3
AGBSB2 - Agricultural Economics	3
CHDVB42 - Child, Family and Community	3
EDUCB8 - Sociocultural Foundations of Education	3
GEOGB2 - Human Geography	3
GEOGB5 - World Regional Geography	3

HISTB9 - Historical Methods: Critical Thinking & Writing in History	3
POLSB4 - Intro to Political Theory	3
PBHSB20 - Introduction to Public Health	3
PBHSB21 - Contemporary Health Concerns	3
PBHSB22 - Drugs, Health and Society	3

**Combination 2 (Total 3)****Take one of the following**

POLSB1 - American Government: National, State and Local	3
POLSB12 - Contemporary Issues in California State and Local Government	3
HISTB18 - History of California	3

**Program Outcomes****Research Laboratory Technology AS**

PSLO	Performance
1. Upon successful completion of the program, the student will be able to apply logical quantitative and qualitative reasoning in solving problems.	70
2. Upon successful completion of the program, the student will be able to demonstrate how to use common laboratory techniques in biology and both general and organic chemistry.	70
3. Upon successful completion of the program, the student will be able to present experimental results and communicate demonstrable quantitative or qualitative limitations of the laboratory experiment.	70
4. Upon successful completion of the program, the student will be able to apply basic principles of laboratory safety and/or regulatory guidance on occupational safety when working in a laboratory environment.	70

**Program Narrative**

**Catalog Description – Describe the program requirements, prerequisite skills or enrollment limitations, student learning outcomes, and information relevant to program goal. This section should be an exact match to the catalog.**

The Associate of Science in Research Laboratory Technology is an appropriate degree for students interested in seeking employment as a laboratory technician or for preparation for the Research Laboratory Technology Bachelor in Science program. This major will provide students with a foundation in chemical laboratory techniques suitable for employment opportunities within local industries as a laboratory technician. The degree teaches essential skills for environmental testing, chemical testing, and emerging laboratory/analysis opportunities in the energy industry.

To Achieve the Associate of Science: Upon completion of graduation requirements and the required degree courses with at least a 'C or P' grade in each course, the student will be awarded a Research Laboratory Technology Associate of Science degree.

**Program Requirements – Include the course requirements and sequencing that reflect Program goals.**

Program requirements

Course	Course Title	Units
CHEM B1A	General Chemistry I	5
CHEM B1B	General Chemistry and Chemical Analysis	5
CHEM B30A	Organic Chemistry for Science Majors	5
MATH B6A	Analytical Geometry/Calculus I	4
BIOL B3B	General Biology II	5

**List A: Select one course from the following:**

ENER B22	Energy Science	4
OSRM B12	Occupational Health	3
OSRM B20	Environmental Health and Hazardous Materials	3
BIOL B8	Environmental Science	3

**Master Planning – Describe how the Program/Certificate aligns with the mission, curriculum, and master planning of the College and higher education in California?**

This program fits into the intersegmental approach for the future by expanding bachelor's degree program in California's Community Colleges. It is a path that leads to the proposed bachelor's degree in Research Laboratory Technology. It will enhance community college capacity to advance equitable baccalaureate attainment by providing this degree program in the STEM Pathway where 70% of entering students are Hispanic / Latinx but only 55-60% of AD-T awardees are Hispanic / Latinx. A local degree with a pathway to a bachelor's degree is anticipated to close this attainment gap and lead to in-demand STEM careers in the region.

**Planning Summary- Please address the following:**

The Department anticipates the need to hire additional faculty for this Program.

**Planning Summary- Please address the following:**

The Department anticipates the need for new/remodeled facilities for this Program.

**Enrollment and Completer Projections – Provide a projection of the number of students to enroll in this Program along with annual completions.**

We anticipate that 30 students will enroll in this program annually.



**Place of Program in Curriculum/Similar Programs – Describe how this Program/Certificate fits in the college’s existing program inventory specifically identifying the Department which will house the Program/Certificate.**

This program will be housed in the Physical Science Department. The curriculum is existing and utilized the new ENRG B22 - Energy Science course which is an emerging area for economic development regionally. The program also utilizes Occupational Health and Risk Management coursework to prepare students for employment in technician positions.

- No inventory records need to be made inactive or changed in connection with approval of the proposed program.
- The program does not replace an existing program, nor is it similar to an existing program.
- There are no related CTE programs at Bakersfield College.

**Similar Programs at Other Colleges in Service Area – Provide the justification/need for the development of this Program; include whether or not similar Programs exist at other Colleges in the region. Include career opportunities.**

A similar program does not exist in the region. Mt. San Antonio College (142 miles away) has a similar associate in science in Applied Laboratory Science Technology; however, the program is not in our region. Also outside of our region is Sacramento City College (274 miles away) which has a certificate program in Chemical Technology. Fresno City College (111 miles away) has a related Laboratory Science Technology certificate award program which average 2 awards annually. In our region, the Southern Central Valley (SCV) / Southern Mother Lode (SML) Center of Excellence, there is a demand for related Laboratory Science Technicians (TOP code 0955.10) (SOC, description, annual openings):

- 19-1029, Biological Scientists, All Other, 56 openings
- 19-4021, Biological Technicians, 56 openings
- 19-4031, Chemical Technician, 39 openings

In the SCV/SML region there are a total of 151 annual opening that are related to the proposed degree program and only one instituting (FCC) producing on average two graduates annually. Most likely demand is being meet with bachelor's level biology and chemistry graduates and dropouts. The proposed program provides a direct route into this career. The proposed program also is a pathway into the proposed bachelor's program in Research Laboratory Technology, which is lead to expanded opportunities beyond the associate degree,

**Choose the percentage of the program that is offered online.**

1%-50%

**FOR PROGRAMS/CERTIFICATES WITH THIRD PARTY REQUIREMENTS This will be the detailed Catalog Requirements. Include the information specific to your Programs or Certificate as specified in your third party accreditation requirements (e.g. Background checks, health screenings, etc.)**

N/A

**FOR CE PROGRAMS ONLY In the space below, include Labor Market Information.**

**Exhibit 1. Research Laboratory Technology employment and occupational projections in the SCV/SML subregion**

Occupation	2021 Jobs	2026 Jobs	5-Year Change	5-Year % Change	Annual Openings
Inspectors, Testers, Sorters, Samplers, and Weighers	3,348	3,510	162	5%	467
Biological Scientists, All Other	359	441	82	23%	56
Biological Technicians	372	391	19	5%	56
Chemical Technicians	310	319	8	3%	39
<b>TOTAL</b>	<b>4,389</b>	<b>4,661</b>	<b>272</b>	<b>6%</b>	<b>618</b>