CTE Program Narrative

NAME OF COLLEGE: Merced College

CONTACT: Valerie Albano

PHONE NUMBER: 209-386-6679

EMAIL ADDRESS: valerie.albano@mccd.edu

DATE: 2/18/16

DIVISION: Science Math and Engineering

FACULTY: Valerie Albano

PROGRAM NAME: Biotechnology-Pre Professional CTE/CT

REASON FOR APPROVAL REQUEST (Check One):

- ☒ New Program Proposal
- ☐ Program Revision Proposal (Substantial or TOP Code Changes)
- ☐ Locally Approved

TYPE OF DEGREE:

- ☐ Certificate of Achievement
- ☐ Associate of Arts
- ☐ Associate of Science
- ☐ Associate of Arts for Transfer
- ☒ Associate of Science for Transfer
- ☐ Other

TRANSFER APPLICABILITY: Yes ☒ No ☐

ATTACHMENTS/INFORMATION REQUIRED:

Labor/Job Market Data and Analysis
Advisory Committee Meeting Minutes
List of Advisory Committee Members
Employer Survey, if applicable

1. Statement of Program Goals and Objectives

Identify the goals and objectives of the program. For CTE programs, the statement must include the main competencies students will have achieved that are required for a specific occupation. The statement must, at a minimum, clearly indicate the specific occupations or fields the program will prepare students to enter and the basic occupational competencies students will acquire.

If the program is selective, describe relevant entry criteria and the selection process for admission to the program. Specify all mandatory fees that students will incur for the program aside from the ordinary course enrollment fee.

For many students who want to stay close to home or save money, community college offers a step up to a university degree, especially in science, technology, engineering and math (STEM) fields. The A.S. Biotechnology: Pre-Professional degree at Merced College is intended to offer students the possibility of transfer to a 4-year university within a STEM field while developing their technological skills and training. These skills will allow students to work in labs as an undergraduate support technicians while earning their B.S. at a 4-year college or university. The A.S. Biotechnology: Pre-Professional degree at Merced College will be offered in parallel with our CTE Biotechnology: Industry program which trains students to enter the biotechnology labor workforce.

2. Catalog Description

Enter exactly as it will appear in the catalog, including program outcomes. The description must also

- *Convey the certificate's goals(s) and objectives*
- *Provide an overview of the knowledge and skills that students who complete the requirements must demonstrate (student learning outcomes)*
- *List all prerequisite skills or enrollment limitations*
- *Mention any risks, such as occupations that are inherently competitive or low-salaried and/or occupational areas where inexperienced graduates are not generally hired.*
- *For CTE programs, the description must list the potential careers students may enter upon completion.*
- *Convey what the student may expect as an outcome*

If applicable, reference accrediting and/or licensing standards. If there is a widely recognized certification provided by a professional association, specify whether the program will fully prepare completers for the recognized professional certification.

The A.S. Biotechnology: Pre-Professional degree is intended to prepare students to enter the Biotechnology workforce or transfer to a four-year institution to complete the requirements for a bachelor's degree.
The Associate in Science degree in Biotechnology: Pre-Professional is available for students who meet the graduation requirements and complete the following required courses, with a minimum grade of a "C" in each course in the degree and maintain a 2.0 GPA. Students are required to complete either the CHEM-02 or CHEM-04 sequence to satisfy the physical science breadth requirement and the BIOL-04 sequence to meet the life science breadth requirement.

3. Program Requirements

The program requirements must be consistent with the catalog description. The number of units, specific course requirements and the sequence of the courses must be coherent, complete and appropriate. Display the program requirements in a table format that includes all courses required for completion of the program (core requirements and required or restricted electives), subtotal of core units, and total program units. For each course, indicate the course department number, course title, and unit value.

Display of Program Requirements

Core Courses	**Title**	**Units**
Biol-09	Introduction to Genetics	**3**
BIOL 20	Microbiology	**4**
BIOL 32	Introduction to Biotechnology	**4**
BIOL 32L	Introduction to Biotechnology Lab	**2**
BIOL 33	Biotechnology II: Advanced Laboratory Techniques and Theory	**4**
CHEM 02B	Introductory Chemistry: Introduction to Organic & Biochemistry	**4**
	or	
CHEM 04B	General Chemistry II	**5**
	Total Core Courses	**25-26**

In addition to the core courses, the student must take at least 10 units from the following courses:

Elective Courses	**Title**	**Units**
BIOL4B	Diversity of Life: Morphology and Physiology	**5**
BIOL 06	Environmental Science	**3**
BIOL 16	General Human Anatomy	4
BIOL 18	Principles of Physiology	**4**
CPSC 01	Introduction to Computer Information Systems	**4**
	or	
CPSC 30	Computer Applications	**3**
PLSC 10	Elements of Plant Science	**3**
	Total Elective Courses	**10**

Total Units Required for Certificate	**35-36**

Display of Proposed Sequence

First Semester	Units
Biol-01 or Biol-04A	4
Chem-02A or Chem-04A	4 or 5
Biol-09	3
Total	**11-12**

Second Semester	Units
Biol-04B	5
Chem -02B or Chem-4B	4 or 5
Total	**9-10**

Third Semester	Units
Biol-20	4
Biol-32	4
Biol-32L	2
Total	**10**

Fourth Semester	Units
Biol-33	4
Total	**4**

4. **Master Planning** (Background and Rationale)

Given the stated goals and objectives, address the role the proposed program will fulfill in the college's mission and curriculum offerings. This discussion may include some history of the program proposal origins, a description of the program purpose, and/or the program's relevancy for the region and college.

The proposal must demonstrate a need for the program that meets the stated goals and objectives in the region the college proposes to serve with the certificate. A proposed new certificate must not cause undue competition with an existing program at another college.

If any expenditures for facilities, equipment or library and learning resources are planned, please explain the specific needs in this section.

If the program is to be offered in close cooperation with one or more specific employers, a discussion of the relationship must be provided.

"Merced College serves as a gateway to the future, providing accessible, affordable, and relevant education and workforce training for students in our richly diverse region. The college offers programs of study that lead to transfer, associate degrees, and certificates. Merced College provides basic skills and noncredit courses, as well as community education for personal and professional enrichment."~ Merced College Mission statement

The proposed A.S. Biotechnology: Pre-Professional degree aligns with the mission of Merced College in that it is a high-quality program targeted to serve STEM students who intend to transfer to a 4-year school in STEM fields. Developed from conversations with students and faculty at UC Davis, the closest university to offer a 4-year degree in

Biotechnology, the Merced College STEM faculty recognized a trend where undergraduate students worked as lab support technicians following transfer. These "undergraduate lab technician" positions offer real world experiences and training for students while allowing them to earn money for their education. The advisory committee supports the development of this degree pathway that will run parallel with the pre-existing A.S. Biotechnology: Industry offered by Merced College.

5. Need for Program

a. Enrollment and Completer Projections

Address and justify the number of projected students or "annual completers" to be awarded the certificate each year after the program is fully established.

According to current student counts it is estimated that approximately 4 students will earn this degree in Year 1, and 8 students in Year 2. We have recently articulated a 2+2 agreement with a local high school for the Biol-32 and Biol-32L courses and will receive the first students after they matriculate next year. We expect that this articulation will greatly enhance the number of students entering this Biotechnology transfer pathway from the current 10-12 per year to as many as 24 students annually.

b. Labor Market Information (LMI)

Summarize the Labor Market Information (LMI) and employment outlook (Including citation for the source of the data) for students exiting the program.

Enter table or chart as a separate attachment.

The LMI information in fields that incorporate Biotechnology skills have seen growth for Biological Technicians (4% increase) and Forensic Science Technicians (5% increase) while other fields remained roughly the same, Food Scientists and Technologists and Biological Scientists, All Other (both 1% increase).
See attachment for data table.

c. Employer Survey (if applicable)

When strong LMI data is not available, an employer survey may be submitted. Provide a copy of the survey, including the number of those surveyed, number of responses, and a summary of the results. The survey must address the extent to which the proposed degree or certificate will be valued by employers.

The A.S. Biotechnology: Pre-Professional is intended to be a CTE/CT degree at Merced College will be offered in parallel with our CTE Biotechnology: Industry program which trains students to enter the biotechnology labor workforce. Since this program is intended to support students in transfer, there are no employer survey data available.

6. Place of Program in Curriculum/Similar Programs

Review the college's existing program inventory, then address the following questions:

- *Do any active inventory records need to be made inactive or changed in connection with the approval or the proposed program? If yes, please specify.*
- *Does the program replace any existing program(s) on the college's inventory? Provide relevant details if this program is related to the termination or scaling down of another program(s).*
- *What related programs are offered by the college?*

There are no in activations are required to offer this program. In addition, this program does not replace any other program offered at Merced College. Rather, the Biotechnology-Pre Professional is intended to serve as a CTE/Transfer program that will be offered concurrently with our Biotechnology-Industry A.S. program. The Pre-Professional program is targeted at students that want to pursue a B.S. in Biotechnology through transfer to a 4-year institution.

7. Similar Programs at Other Colleges in Service Area

List similar programs offered at other colleges within the Central/Mother Lode Region that may be adversely impacted. Enter 'none' if there are no similar programs.

College	Program
none	none

Supporting documentation required

Labor Market Information

In a separate attachment, provide current Labor Market Information showing that jobs are available for program completers within the local service area. Statewide or national LMI may be included as supplementary support but evidence of need in the specific college service area or region is also necessary.

List of Members of Advisory Committee

This list must include advisory committee member names, job titles, and affiliations.

Name	Title	Affiliation
Valerie Albano	Professor of Biological Sciences	Merced College
Doug Kain	Dean of Sci., Math and Eng.	Merced College
Edward Modafferi	Professor of Biological Sciences	Merced College
Theresa Costa	Academic Advisor	UC Davis
Denneal Jamison-McClung	Associate director: ADVANCE	UC Davis
John I Yoder, Professor	Department of Plant Sciences Academic	UC Davis
Dr. Kjelstrom	Director of Biotechnology	UC Davis

Recommendation of Advisory Committee (Meeting Minutes)

In a separate attachment, provide minutes of the advisory committee meetings at which the program was discussed and approved, with relevant areas highlighted, as well as a summary of the advisory committee recommendations.

Biotechnology Advisory Group Meeting Minutes

September 25, 2012 1:00 p.m.

Phone meeting; SCI-139

Attendees via e-mail: Valerie Albano (Merced College), Doug Kain (Merced College), John Yoder (UC Davis)

1. Review of the e-mail communications.

2. Discussion of the proposed Biol-32 and Biol-32L courses for articulation. John suggested adding a research project for the students at the end of the semester.

3. Discussion of the BIT1 curriculum. John suggested to incorporate a discussion section the Biol-32. There was a lot of discussion regarding lab math and the use of the discussion time to review math and to research/present the research projects.

4. Future meeting: phone conference scheduled for 9-25-12 at 1:00 p.m.

Biotechnology Advisory Group Meeting Minutes

January 10, 2013 11:00 a.m.

E-mail meeting

Attendees via e-mail: Valerie Albano (Merced College), Doug Kain (Merced College), John Yoder (UC Davis), Theresa Costa (UC Davis), Denneal Jamison-McClung (UC Davis)

1. Review of the e-mail communications.

2. Biol-32 and Biol-32L have been approved by the Merced College curriculum committee. Dr. Albano would requested articulation of Biol-32 for BIT1 at UC Davis.

3. John Yoder recognizes that the discussion section and the class project have been added to the Biol-32 course. He feels that this would make the courses equivalent.

4. Theresa asks if Biol-32L is going to also articulate. Dr. Albano will be putting both courses through for approval as breadth courses at UC Davis. Biol-32 will articulate directly with BIT1.

4. Future meeting: None requested at this time.

Biotechnology Advisory Group Meeting Minutes

September , 2013 10:00 a.m.

E-mail meeting

Attendees via e-mail: Valerie Albano (Merced College), Doug Kain (Merced College), John Yoder (UC Davis)

1. Introductions
2. Outlining the current Biotech program at Merced College
3. Outline of the 3 part Biotech pathway
    - A.S. Biotechnology-Transfer
    - A.S. Biotechnology-Industry
    - Biotechnology-Certificate
4. Discuss BIT1 at UC Davis and articulation possibilities

    Valerie sent the proposed course outlines for Biol-32 and Biol-32L to Biotech Advisory Committee for review.
    - E-mail meeting with the Director of Biotechnology at UC Merced, Dr. Kjelstrom.
    - Phone conference with Bio-Tech Adversity Committee scheduled for 9-25-14 at 1:00 p.m.
        - After advisory committee review, Dr Kjelstrom moved the A.S. Biotechnology-Transfer, A.S. Biotechnology-Industry, and Biotechnology-Certificate be offered at Merced College. Seconded and vote passes unanimously.

Central California Region
Biotechnology Technician Worker Occupations 2014-15

Occupation Group	SOC	Description	2013 Jobs	2016 Jobs	Change	% Change	Replacements	Openings	Annual Openings	Pct 10 Hourly Earnings	10th Percentile Annual	Median Hourly Earnings	Median Annual Wages	Education Level
Life, Physical, and Social Science Occupations (19)	19-1012	Food Scientists and Technologists	474	469	(5)	(1%)	62	62	21	$17.76	$36,941	$26.58	$55,286	Bachelor's degree
Life, Physical, and Social Science Occupations (19)	19-1029	Biological Scientists, All Other	364	359	(5)	(1%)	36	36	12	$17.24	$35,859	$31.22	$64,938	Bachelor's degree
Life, Physical, and Social Science Occupations (19)	19-4021	Biological Technicians	519	541	22	4%	51	73	24	$12.04	$25,043	$16.13	$33,550	Bachelor's degree
Life, Physical, and Social Science Occupations (19)	19-4092	Forensic Science Technicians	139	146	7	5%	18	25	8	$21.51	$44,741	$32.36	$67,309	Bachelor's degree
Healthcare Practitioners and Technical Operations Occupations (29)	29-2011	Medical and Clinical Laboratory Technologists	1,104	1,154	50	5%	104	154	51	$24.85	$51,688	$36.69	$76,315	Bachelor's degree
Healthcare Practitioners and Technical Operations Occupations (29)	29-2012	Medical and Clinical Laboratory Technicians	1,150	1,281	131	11%	99	230	77	$12.68	$26,374	$17.41	$36,213	Associate's degree

Source: Economic Modeling Specialist, International (EMSI), Q3 2015
* Openings=New and replacement jobs

Central California region includes to following counties

Fresno
Madera
Mariposa
Merced
San Joaquin
Stanislaus
Toulumne

C·O·E CENTERS OF EXCELLENCE
Inform Connect Advance