

Foothill College
Credit Program Narrative
Certificate of Achievement in STEAM Instructional Leadership

Item 1. Program Goals and Objectives

What are the academic and vocational goals of this certificate? What are the general program objectives?

Program Learning Outcomes:

- Students will be able to integrate multiple STEAM disciplines into their curriculum.
- Students will be able to teach STEAM using culturally responsive practices that will support a diverse body of teachers and students.
- Students will be able to identify emerging STEAM fields that will influence instruction and workforce development.
- Students will be able to facilitate professional development for their peers/staff to incorporate STEAM into all subject areas.
- Students will be able to influence curriculum decisions around STEAM based on best practices and high content knowledge.
- Students will be able to facilitate interactions and collaboration to build a community that fosters active learning.
- Students will be able to identify technology that will facilitate the learning of STEAM in engaging and meaningful ways.
- Students will be able to curate and create STEAM instructional materials, tools, strategies, and resources to engage all learners and ensure achievement of academic goals.

What knowledge and skills will students acquire as part of their participation in the program?

The Certificate of Achievement in STEAM Instruction Leadership is designed for pre-service teachers and educators at any level who want to grow as STEAM (Science, Technology, Engineering, Art, and Mathematics) leaders in their schools, districts, and/or counties. The focus of the program will be on interdisciplinary science, technology, engineering, and math topics that will provide participants with an opportunity to integrate those disciplines into all of their curriculum. The program will also focus on best practices to create a diverse workforce with materials that are culturally relevant to all participants. Skills learned include the ability to identify topics that can be interwoven into multiple subjects including but not limited to foreign language, English and language arts, social sciences, history, business, math, computer science, engineering, and science. Upon completion of the program, students will be prepared to support any and all STEAM initiatives in their districts, schools, or counties as well as provide relevant workshops and courses in STEAM instruction.

Item 2. Catalog Description

This should include program requirements, prerequisite skills or enrollment limitations, and information relevant to program goals.

The Certificate of Achievement in STEAM Instructional Leadership is designed for students working in or planning for a career in K-12 education, extracurricular programs, or STEAM outreach in for-profit

and non-profit organizations. The program provides 12 units of instruction and support for the integration of STEAM throughout curriculum in a culturally responsive manner. Courses will focus on technology integration into STEAM lessons, evaluating instructional programs, and data analysis tools. Upon completion of the program, students will be prepared to develop and support STEAM initiatives in their districts, schools, counties, and communities as well as provide relevant workshops and courses in STEAM instruction.

Item 3. Program Requirements

Update the table, below, to include all core and support courses for the program (note that support courses are called “Restricted Electives” by the state). In the Requirements column, list the total units for core courses and the total units for support courses. In the Sequence column, list the typical year and quarter during which the student will take the course. List the total units for the program requirements (core and support courses combined) beneath the table.

Requirements	Course #	Title	Units	Sequence
Core Courses (9 units)	LINC 53	Integrating Technology Into Mathematics	1	Year 1, Fall
	LINC 91A	Introduction to Assessing Instructional Technology	3	Year 1, Fall
	LINC 88	Introduction to Computer Operating Systems	4	Year 1, Winter
	LINC 63	Cloud-based Data Analysis Tools	1	Year 1, Spring
Restricted Electives (3 units)	LINC 78A	Computational Thinking for Educators	2	Year 1 Fall
	LINC 91B	Evaluating Technology-based Learning Outcomes	3	Year 1, Spring
	LINC 91C	Evaluating Instructional Programs	3	Year 1, Spring
	LINC 98A	Teaching and Learning in the Digital Age I	0.5	Year 1, Fall
	LINC 98B	Teaching and Learning in the Digital Age II	0.5	Year 1, Winter
	LINC 50A	Technology in the K-12 Classroom II	0.5	Year 1, Winter
	LINC 50B	Technology in the K-12 Classroom III	0.5	Year 1, Spring
	LINC 53B	Integrating Technology Into Mathematics Grades 6-8	0.5	Year 1, Fall
	LINC 96B	Handheld Digital Media Devices I	0.5	Year 1, Fall
LINC 79	Multimedia Project Production	2	Year 1 Winter	

TOTAL UNITS: # of units

Update the list, below, to identify the number of units the student will likely take each quarter (program courses only).

Proposed Sequence:

Year 1, Fall = 4-6 units

Year 1, Winter = 4-6 units
Year 1, Spring= 4-6 units

TOTAL UNITS: 12

Item 4. Master Planning

How does the program align with the Foothill College Mission Statement? How does the program fit the curriculum and master planning of Foothill College, as well as higher education in California?

Foothill's mission is to offer equitable programs and services that empower students to achieve their goals and become productive citizens. By offering the Certificate of Achievement in STEAM Instructional Leadership, Foothill will provide an invaluable opportunity for educators, coordinators, and instructors at all levels, particularly those who come from underrepresented minority backgrounds, to establish themselves as leaders in STEAM Instruction. These leaders would be empowered to provide culturally responsive instruction and leadership to their districts and counties. By modeling best practices in STEAM instruction, students in the program will experience opportunities to deepen their understanding of the interdisciplinary ways in which STEAM can be incorporated into learning experiences at all levels.

According to the Cambridge University Press, many of the top journals in STEAM have a 'WEIRD' problem, in that their focus is on Western, Educated, Industrialized, Rich, and Democratic societies [1]. Black and Hispanic workers are underrepresented in the STEAM workforce with Black workers representing 9% of the STEAM workforce and Hispanic workers make up only 7% while combined, they make up 27% of the total workforce [2]. There is a systemic need for programs to provide underrepresented minority educators with an opportunity to become leaders in STEAM education. This certificate will enable educators, coordinators, and instructors, particularly those of color, to establish themselves as thought leaders in STEAM education and engage in culturally responsive practices within this field. .

In 2018, a report was released by the Society for College and University Planning stated the importance of community colleges in tackling workforce development in STEAM, particularly focusing on the California Community College System. If coordinated properly, the CCCS could alleviate the problem and develop programs that diversify and grow the STEAM workforce [3]. Upon completion of the STEAM Instructional Leadership Program, students will be able to provide high quality STEAM instruction and will be able to provide high quality workshops and webinars on best practices of STEAM instruction.

[1] Henrich, J. (2010, June 15). *The weirdest people in the world?* | *Behavioral and Brain Sciences*. Cambridge Core.
<https://www.cambridge.org/core/journals/behavioral-and-brain-sciences/article/weirdest-people-in-the-world/BF84F7517D56AFF7B7EB58411A554C17>

[2] Funk, C., & Parker, K. (2020, May 30). *1. Diversity in the STEAM workforce varies widely across jobs*. Pew Research Center's Social & Demographic Trends Project.

<https://www.pewsocialtrends.org/2018/01/09/diversity-in-the-STEAM-workforce-varies-widely-across-jobs/>

[3] Monis, I. (2018). Designing for STEAM: California Community Colleges Are Helping Shape the STEAM Workforce of the Future. *Planning for Higher Education*, 47(1), 32+.

Item 5. Enrollment and Completer Projections

How many students are projected to complete the program after the initial year? After five years? List and explain the projections.

In the first year, there are projected to be 30 students who complete the certificate. After the first year, there will be two cohorts of 30 students. After five years, approximately 270 students will have completed the program. This projection is based on data from student participation in the Krause Center for Innovation’s FAME and EMPowered programs over the past decade.

*Additionally, update the table, below, to include all courses for the program (core and support), and provide **historical** enrollment data from the past two years. Foothill’s Institutional Research department can help provide this data; [visit their website](#) to submit a request. If a course is new or has not been offered in the past two years, enter N/A for the annual sections and annual enrollment.*

Course #	Course Title	Year 1 (18-19)		Year 2 (19-20)	
		Annual Sections	Annual Enrollment	Annual Sections	Annual Enrollment
LINC 53	Integrating Technology Into Mathematics	1	30	1	20
LINC 91A	Introduction to Assessing Instructional Technology	N/A	N/A	1	22
LINC 88	Introduction to Computer Operating Systems	N/A	N/A	N/A	N/A
LINC 63	Cloud-based Data Analysis Tools	1	41	1	30
LINC 91B	Evaluating Technology-based Learning Outcomes	1	25	1	32
LINC 91C	Evaluating Instructional Programs	1	18	1	17
LINC 98A	Teaching and Learning in the Digital Age I	N/A	N/A	N/A	N/A
LINC 98B	Teaching and Learning in the Digital Age II	N/A	N/A	N/A	N/A
LINC 50A	Technology in the K-12 Classroom II	N/A	N/A	N/A	N/A

LINC 50B	Technology in the K-12 Classroom III	N/A	N/A	N/A	N/A
LINC 53B	Integrating Technology Into Mathematics Grades 6-8	N/A	N/A	1	20
LINC 96B	Handheld Digital Media Devices I	N/A	N/A	1	70
LINC 78A	Computational Thinking for Educators	1	58	3	66
LINC 79	Multimedia Project Production	2	99	1	24
	totals (using current enroll#) -totals updated 12/28/20		271		301

Item 6. Place of Program in Curriculum/Similar Programs

How does the program fit in Foothill College’s existing program inventory?

Currently, Foothill College doesn’t offer a STEAM Instruction program, and this will tangentially relate to the Instructional Design and Technology certificate as there is a focus on the integration of technology into the curriculum. This certificate reflects the Krause Center for Innovation’s mission to empower teachers and transform the learning experience through innovative and effective practices.

Item 7. Similar Programs at Other Colleges in Service Area

Are there other programs similar to this one already in place offered in Foothill’s service area?

San Jose State University offers a Certificate in Math Instruction, but there is not a certification in the immediate area that offers a more holistic STEAM Instructional Leadership certification.

Is the program similar to successful programs outside of the service area?

There are several colleges and universities that offer STEAM Instruction Certificates including Johns Hopkins University, Drexel University, National Institute of STEAM Education, Colorado University, Fresno Pacific University, California State University, San Bernadino, and several other schools across the country. The CSUSB certificate consists of 4 units of credit upon completion whereas at Drexel, students earn 12 units of credit.

Additional Information Required for State Submission:

TOP Code: 0860.00- Educational Technology

Annual Completers: 50

Net Annual Labor Demand:

Faculty Workload: *PT Adjunct faculty load would be between .044 and .133 each quarter*

New Faculty Positions: *0*

New Equipment: *0*

New/Remodeled Facilities: *0*

Library Acquisitions: *0*

Gainful Employment: *Yes*

Program Review Date: *February 2022*

Distance Education: *This is the percentage of program courses conducted online; choose from the following:* 0% 1-49% **50-99%** 100%

Please note that significant lead time (one month or longer) may be necessary to obtain the following documents/approvals. Please work with the AVP of Instruction during the beginning stages of program creation to submit your requests for the following:

ATTACH THE FOLLOWING (non-Apprenticeship):

- 1. Labor Market Information and Analysis**
- 2. Advisory Committee Recommendation** *(includes advisory committee membership, minutes, and summary of recommendations)*
- 3. Regional Consortia Approval Meeting Minutes** *(showing program recommendation)*

ATTACH THE FOLLOWING (Apprenticeship only):

- 1. Labor Market Information and Analysis**
- 2. Approval Letter from the California Division of Apprenticeship Standards (DAS)**