

College Curriculum Committee Meeting Agenda
Tuesday, June 1, 2021
2:00 p.m. – 3:30 p.m.
Meeting will be held virtually via ConferZoom

Item	Time*	Action	Attachment(s)	Presenter(s)
1. Minutes: May 18, 2021	2 min.	Action	#6/1/21-1	Kuehnl
2. Report Out from Division Reps	5 min.	Discussion		All
3. Public Comment on Items Not on Agenda (CCC cannot discuss or take action)	5 min.	Information		
4. Announcements a. New Course Proposals b. Division Reps for 2021-22 c. Upcoming COR Deadline—June 18 d. Curriculum Institute Virtual Conference (July 7-9— more info here)	5 min.	Information	#6/1/21-2-10	CCC Team
5. New Program Application: Biochemistry AS	5 min.	2nd Read/ Action	#6/1/21-11	Kuehnl
6. New Program Application: Data Analytics CA	5 min.	2nd Read/ Action	#6/1/21-12	Kuehnl
7. New Program Application: Network Computing CA	5 min.	1st Read	#6/1/21-13	Kuehnl
8. Guided Pathways Mapping Approval Process	15 min.	2nd Read/ Action	#6/1/21-14	Kuehnl
9. CCC Priorities for 2021-22	15 min.	Discussion		Kuehnl
10. ASCCC Consultation Report Out	30 min.	Discussion		Kuehnl
11. Good of the Order	3 min.			Kuehnl
12. Adjournment				Kuehnl

**Times listed are approximate*

Attachments:

- #6/1/21-1 Draft Minutes: May 18, 2021
- #6/1/21-2 New Course Proposal: C S 77A
- #6/1/21-3 New Course Proposal: C S 77B
- #6/1/21-4 New Course Proposal: C S 78W
- #6/1/21-5 New Course Proposal: C S 78X
- #6/1/21-6 New Course Proposal: C S 78Y
- #6/1/21-7 New Course Proposal: C S 78Z
- #6/1/21-8 New Course Proposal: C S 203A
- #6/1/21-9 New Course Proposal: ENGL 10A
- #6/1/21-10 New Course Proposal: NCBS 443A
- #6/1/21-11 New Program Application: Biochemistry AS
- #6/1/21-12 New Program Application: Data Analytics CA
- #6/1/21-13 New Program Application: Network Computing CA
- #6/1/21-14 Guided Pathways Program Map Approval Process—draft (updated)

2020-2021 Curriculum Committee Meetings:

<u>Fall 2020 Quarter</u>	<u>Winter 2021 Quarter</u>	<u>Spring 2021 Quarter</u>
10/6/20	1/19/21	4/20/21
10/20/20	2/2/21	5/4/21
11/3/20	2/16/21	5/18/21
11/17/20	3/2/21	6/1/21
12/1/20	3/16/21	6/15/21

Standing reminder: Items for inclusion on the CCC agenda are due no later than one week before the meeting.

2020-2021 Curriculum Deadlines:

12/1/20	Deadline to submit courses to CSU for CSU GE approval (Articulation Office).
12/1/20	Deadline to submit courses to UC/CSU for IGETC approval (Articulation Office).
2/16/21	Deadline to submit local GE applications for 2021-22 catalog (Faculty/Divisions).
4/23/21	Curriculum Sheet updates for 2021-22 catalog (Faculty/Divisions).
6/1/21	Deadline to submit new/revised courses to UCOP for UC transferability (Articulation Office).
6/18/21	Deadline to submit <u>all</u> new courses and certain types of course updates for 2022-23 catalog— see PDF for details (Faculty/Divisions).
11/5/21	Deadline to submit certain types of course updates for 2022-23 catalog— see PDF for details (Faculty/Divisions).
<i>Ongoing</i>	Submission of courses for C-ID approval and course-to-course articulation with individual colleges and universities (Articulation Office).

Distribution:

Micaela Agyare (LIBR), Chris Allen (Dean, APPR), Ben Armerding (LA), Rachelle Campbell (BH), Zachary Cembellin (PSME), Anthony Cervantes (Dean, Enrollment Services), Mark Ferrer (SRC), Owen Flannery (KA), Valerie Fong (Interim Dean—LA), Marnie Francisco (PSME), Evan Gilstrap (Articulation Officer), Hilary Gomes (FA), Allison Herman (LA), Kurt Hueg (Administrator Co-Chair), Maritza Jackson Sandoval (CNSL), Eric Kuehnl (Faculty Co-Chair), Andy Lee (CNSL), Debbie Lee (Acting Dean—FA & KA), Laurence Lew (BSS), Kristy Lisle (VP Instruction), Don Mac Neil (KA), Kathryn Maurer (AS President), Kent McGee (Evaluations), Michelle McNeary (LA), Ché Meneses (FA), Brian Murphy (APPR), Teresa Ong (AVP Workforce), Ron Painter (PSME), Kas Pereira (BSS), Katy Ripp (KA), Lisa Schultheis (BH), Ram Subramaniam (Dean—BH & PSME), Kella Svetich (LA), Mary Vanatta (Curriculum Coordinator), Priya Vasu (ASFC), Anand Venkataraman (PSME)

COLLEGE CURRICULUM COMMITTEE

Committee Members – 2020-21

Meeting Date: 6/1/21Co-Chairs (2)

<input checked="" type="checkbox"/>	Eric Kuehnl	7479	Vice President, Academic Senate (tiebreaker vote only)	kuehneric@fhda.edu
<input type="checkbox"/>	Kurt Hueg	7179	Associate Vice-President of Instruction	huegkurt@fhda.edu

Voting Membership (1 vote per division)

<input checked="" type="checkbox"/>	Micaela Agyare	7086	Library	agyaremicaela@fhda.edu
<input type="checkbox"/>	Rachelle Campbell	7469	BH	campbellrachelle@fhda.edu
<input type="checkbox"/>	Zachary Cembellin	7383	PSME	cembellinzachary@fhda.edu
<input type="checkbox"/>	Mark Ferrer		SRC	ferrermark@fhda.edu
<input checked="" type="checkbox"/>	Owen Flannery	7213	KA	flanneryowen@fhda.edu
<input checked="" type="checkbox"/>	Valerie Fong	7135	Interim Dean—LA	fongvalerie@fhda.edu
<input checked="" type="checkbox"/>	Marnie Francisco	7420	PSME	franciscomarnie@fhda.edu
<input checked="" type="checkbox"/>	Evan Gilstrap	7675	Articulation	gilstrapevan@fhda.edu
<input checked="" type="checkbox"/>	Hilary Gomes	7585	FA	gomeshilary@fhda.edu
<input checked="" type="checkbox"/>	Allison Herman	7460	LA	hermanallison@fhda.edu
<input checked="" type="checkbox"/>	Maritza Jackson Sandoval	7409	CNSL	jacksonsandovalmaritza@fhda.edu
<input checked="" type="checkbox"/>	Andy Lee	7783	CNSL	leeandrew@fhda.edu
<input checked="" type="checkbox"/>	Debbie Lee	7497	Acting Dean—FA, KA	leedebbie@fhda.edu
<input checked="" type="checkbox"/>	Laurence Lew	6138	BSS	lewlaurence@fhda.edu
<input checked="" type="checkbox"/>	Don Mac Neil	7248	KA	macneildon@fhda.edu
<input checked="" type="checkbox"/>	Ché Meneses	7015	FA	menesesche@fhda.edu
<input checked="" type="checkbox"/>	Brian Murphy		APPR	brian@pttc.edu
<input checked="" type="checkbox"/>	Ron Painter		PSME	painterron@fhda.edu
<input checked="" type="checkbox"/>	Kas Pereira	7319	BSS	pereiracassandra@fhda.edu
<input checked="" type="checkbox"/>	Lisa Schultheis	7780	BH	schultheislisa@fhda.edu
<input checked="" type="checkbox"/>	Kella Svetich	7924	LA	svetichkella@fhda.edu
<input checked="" type="checkbox"/>	Anand Venkataraman	7495	PSME	venkataramananand@fhda.edu

Non-Voting Membership (4)

<input checked="" type="checkbox"/>	Priya Vasu		ASFC Rep.	asfc.priyav@gmail.com
<input checked="" type="checkbox"/>	Mary Vanatta	7439	Curr. Coordinator	vanattamary@fhda.edu
<input type="checkbox"/>	Kent McGee	7298	Evaluations	mcgeekent@fhda.edu
<input type="checkbox"/>			SLO Coordinator	

Visitors

 Chris Allen, Anthony Cervantes, Kristy Lisle, Ram Subramaniam

**College Curriculum Committee
Meeting Minutes
Tuesday, May 18, 2021
2:00 p.m. – 3:30 p.m.
Meeting held virtually via ConferZoom**

Item	Discussion
1. Minutes: May 4, 2021	Approved by consensus.
2. Report Out from Division Reps	<p>Speaker: All Apprenticeship: Working on Distance Learning Addendum submissions; working on CORs for CWE courses.</p> <p>Bio Health: Working on DL Addendum submissions and Title 5 updates.</p> <p>BSS: Working on DL Addendum submissions and FSAs.</p> <p>Counseling: Working on FSAs.</p> <p>Fine Arts: Working on Title 5 updates; discussing Guided Pathways mapping.</p> <p>Kinesiology: No updates to report.</p> <p>Language Arts: Working on Title 5 updates and DL Addendum submissions. ESLL dept. planning to reactivate ESLL 26. Making headway on Ethnic Studies. Pushing equity alignment across the division.</p> <p>Library: No updates to report.</p> <p>PSME: Working on Title 5 updates.</p> <p>Articulation: We still have not received our CSU GE or IGETC results— were supposed to receive on Friday. Other colleges also haven't received results. Attended CSU webinar on Ethnic Studies last week—intense meeting, attended by more than just AOs. Some attendees upset their courses had been denied, including some colleges with long-standing Ethnic Studies depts. Many asking who the reviewers were; contentious environment. Unsure what may come out as result of meeting. Language Arts rep wondered if CORs for denied courses (from longstanding depts.) hadn't met specific competencies for GE—Gilstrap noted that denial notices included boilerplate language and were not specific as to which competencies were not met, resulting in a lot of frustration re: what needs to be revised for resubmission. Fong asked for clarification re: reason for denials due to not meeting competencies—Gilstrap believes so, and shared some examples from meeting of approvals and denials.</p>
3. Public Comment on Items Not on Agenda	<p>BSS rep mentioned 2021 Business Innovation Challenge event—shared flyer. 1st round: May 24th & 25th. Asked group to please pass info to students and encourage them to view classmates' ideas and vote (students who vote will get access to pilot program to connect to internships); also asked for volunteers to serve as "secret shopper" voters, to help identify best ideas.</p> <p>Language Arts rep mentioned Research and Service Leadership Symposium coming up on May 20th.</p>
4. Announcements a. New Course Proposal	<p>Speakers: CCC Team The following proposal was presented: MATH 83. Please share with your constituents. Jinnah asked if cross-listed—per PSME rep, will be cross-</p>

<p>b. LINC CA Approvals</p>	<p>listed with BIOL 81 and new CHEM 81.</p> <p>Vanatta shared that the CCCCCO has approved the following new Certificates of Achievement: Education Technology Specialist, Emerging Educational Technology Leadership, STEAM Instructional Leadership.</p>
<p>5. Program Deactivation: Instructional Design and Technology CA</p>	<p>Speaker: Eric Kuehnl Second read of deactivation of Instructional Design and Technology Certificate of Achievement. No comments.</p> <p>Motion to approve M/S (Venkataraman, Agyare). Approved.</p>
<p>6. Local Apprenticeship AS Degree</p>	<p>Speaker: Eric Kuehnl Review of Cooperative Work Experience Education Plan. No questions or comments from the group.</p> <p>Motion to approve M/S (Murphy, Schultheis). Approved.</p>
<p>7. New Program Application: Biochemistry AS</p>	<p>Speaker: Eric Kuehnl First read of new Biochemistry AS degree. No comments.</p> <p>Second read and possible action will occur at next meeting.</p>
<p>8. New Program Application: Data Analytics CA</p>	<p>Speaker: Eric Kuehnl First read of new Data Analytics Certificate of Achievement. Language Arts rep asked about ethical training—per BSS rep, modules include topics such as cognitive bias.</p> <p>Second read and possible action will occur at next meeting.</p>
<p>9. Guided Pathways Mapping Approval Process</p>	<p>Speaker: Eric Kuehnl First read of Guided Pathways Program Map Approval Process. Kuehnl encouraged the group to make suggestions about draft. PSME rep commented on second paragraph in Process section, noting that "substantial" could mean different things to different people; suggested using more specific language. Kuehnl agreed and explained his idea of "substantial" means any core courses listed on Map from different division. PSME rep suggested that intent should drive the process; asked if intent is to prevent another division from getting upset or from feeling like their input wasn't included. Noted recent trend at CCC to take steps to encourage transparency and communication (e.g., New Course Proposal form creation). Language Arts rep believes important to think about who are the invested groups (i.e., who needs to see Maps) and how CCC can help to give clear steps to ensure feedback from all such groups included. Kuehnl noted issue is related to our decentralized model. Language was chosen to try to avoid putting up barriers; open to modifications. Counseling rep noted some Maps "stacked" with another major due to nature of elective coursework—perhaps this could be mentioned in the language.</p> <p>Jinnah appreciates that document delegates decision-making to Division CCs and asked if CCC will provide them with any guidance for review and clarity on exactly what they're approving. Agreed with concerns about "substantial" language; also concerned that the conversations could result in a lot of work for Division CCs. Noted that many Maps include courses from different division. Kuehnl thinks elective courses and GE shouldn't require consultation, as Guided Pathways (GP) team using their expertise in making those selections—acknowledged there could be examples of large impact to a dept. outside the division. Agreed that requiring consultation re: electives and GE would be a huge barrier to Division CC approval of Maps. Believes logical to include consultation for Maps that have multi-disciplinary core coursework.</p> <p>Other Language Arts rep asked Jinnah process question about creating</p>

	<p>Map with courses from other divisions, re: ensuring they're listed correctly, for scheduling. Jinnah mentioned discussions with deans to talk through such issues and get them resolved while Maps being drafted. Other Language Arts rep asked about process for annual review/approval of Maps—Kuehnl suggested could be done during the spring. Rep asked if document should include details re: where consultations with different divisions would take place and at what stage in Maps' creation; would it be at CCC? Kuehnl believes having such conversations at CCC could result in logistical issues (although not opposed to it), and hopes that conversations would happen during process of creating Map with GP team.</p> <p>Fine Arts rep asked about process for situations in which Division CC reviews Map and wants something changed, noting recent example of their Division CC discussing placement of certain course that spans three Maps within division. Kuehnl believes modification of Maps should involve GP team—Jinnah agrees that for this first year, to please send changes to her. Going forward, important to determine who will be updating Maps and how. Hueg believes that once we've been working with Maps for a year we'll have experience to be able to determine process for ongoing updates. Jinnah mentioned GP team is working with dept. chairs, who generally know when courses within dept. are commonly scheduled.</p> <p>Fine Arts rep asked if counselors can be added to Process section—Kuehnl believes "Guided Pathways Team" implies counselors are involved; asked Jinnah. Jinnah agrees with terminology, but noted that once this year ends, GP Mapping Team co-lead position will be open to all faculty and may not necessarily be a counselor; suggested adding counselors alongside GP team. Language Arts rep asked if relevant dept. chairs should be added—Kuehnl noted that some depts. don't have a chair, which is why document states "faculty from the department." Rep noted their division has designated point-people for Maps; Kuehnl believes this is the case in other divisions. Jinnah noted that GP team does have list of designated people to contact; suggested using "department faculty/chair."</p> <p>Document will be updated for second read based on comments, including clarifying "substantial coursework" language.</p> <p>Second read and possible action will occur at next meeting.</p>
<p>10. FSA Information Session</p>	<p>Speaker: Kurt Hueg Guest presenter: Kathy Perino from Faculty Association. Kuehnl recently reached out to reps to provide FSAs for courses that are missing that info on the COR. Hueg mentioned that CourseLeaf form requires every course have an FSA listed, adding he doesn't think it should be required since some courses don't have one. FSA gathering process sparked conversations in BSS re: depts. whose courses don't have an obvious FSA, as well as discussions re: using Interdisciplinary Studies FSA. Today's session should provide information about FSAs and why we have them.</p> <p>Perino explained that FSA means Faculty Service Area. Not the same as Minimum Qualifications (MQs), discipline, or dept., although may have the same name as one or more of those. FSAs are defined by the district—any area in which full-time faculty can provide service. In contrast, MQs are defined by the state and used statewide across all districts. No requirement that FSAs align with other districts. When full-time faculty member assigned an FSA, it means they are qualified to teach at least one course within that FSA as part of full-time load. FSAs do not apply to part-time faculty. The only time FSAs come into play is when there are full-time tenured faculty layoffs—FSAs help determine who has the right to keep their job, and who gets laid off.</p>

	<p>Fong asked for clarification re: how faculty earns an FSA. Perino mentioned language is in contract; when hired as full-time faculty, assigned an FSA (usually what's associated with courses they're teaching). Can acquire more FSAs, earned by having experience teaching other courses (by teaching as part of load; must meet MQs in discipline for other courses). Noted that seniority re: FSAs is district-wide.</p> <p>Perino addressed issue re: Interdisciplinary Studies FSA, noting that assigning this FSA to a course doesn't mean that faculty teaching one course with this FSA means they can then teach any course in this FSA, as discipline (MQs) determines faculty's ability to teach course, not FSA. Only affects layoff situation. Hueg noted that multiple depts. want to use this FSA—good to know that the discipline listed on COR is what's important re: who can teach course. Perino argued that every course should be assigned an FSA, adding that Apprenticeship courses not having an FSA not a big deal because currently only adjunct faculty teach those courses. If no full-time faculty ever teaching Apprenticeship courses, doesn't matter if courses have an FSA or not. If full-time faculty teaching a course, it should have an FSA listed. Mentioned language in contract re: process to create a new FSA—involves Faculty Association, Academic Senate, district.</p> <p>Perino mentioned most recent budget crisis and related discussions of eliminating programs/positions, which prompted everyone to begin looking at FSA list. Such situations are probably the worst times to try to fix FSA issues—best to fix issues now, before another such crisis.</p> <p>Hueg mentioned certain positions listed on FSA list (e.g., "Director" titles)—Perino agrees strange for name of FSA to include that language, and noted that FSA list includes non-instructional areas for which faculty can be hired.</p> <p>Fong asked question about whether FSA would usually match discipline on the COR—Perino noted that some FSA names and discipline names do match, but not all. Reminded group to choose FSAs from FSA list. Encouraged group to email her with any questions. Kuehnl mentioned that most reps have already sent him their missing FSAs; asked remaining reps to please follow up with questions as soon as possible and complete their lists, so that he can combine info for Vanatta to enter on CORs.</p>
<p>11. CCC Priorities for 2021-22</p>	<p>Speaker: Eric Kuehnl Kuehnl would like the group to set priorities for next year, especially for fall quarter. Shared survey he sent last spring, to set this year's priorities, and noted that CCC has accomplished most of them. Asked reps to enter suggestions in the chat, which he will use to create survey—can also email ideas to him, if don't want to enter in chat.</p>
<p>12. Good of the Order</p>	
<p>13. Adjournment</p>	<p>3:32 PM</p>

Attendees: Micaela Agyare (LIBR), Chris Allen (Dean, APPR), Zach Cembellin (PSME), Valerie Fong (Acting Dean, LA), Marnie Francisco (PSME), Evan Gilstrap (Articulation Officer), Hilary Gomes (FA), Allison Herman (LA), Kurt Hueg (Administrator Co-Chair), Maritza Jackson Sandoval (CNSL), Fatima Jinnah (CNSL), Eric Kuehnl (Faculty Co-Chair), Andy Lee (CNSL), Laurence Lew (BSS), Kristy Lisle (VP Instruction), Don Mac Neal (KA), Ché Meneses (FA), Brian Murphy (APPR), Teresa Ong (AVP Workforce), Kas Pereira (BSS), Kathy Perino (Faculty Association), Lisa Schultheis (BH), Ram Subramaniam (Dean, BH & PSME), Kella Svetich (LA), Mary Vanatta (Curriculum Coordinator), Anand Venkataraman (PSME)

Minutes Recorded by: M. Vanatta

Course Change Request

New Course Proposal

Date Submitted: 05/15/21 3:52 pm

Viewing: **C S F077A : ADVANCED WEB APPLICATION DEVELOPMENT**

Last edit: 05/27/21 2:09 pm

Changes proposed by: Baba Kofi Weusijana (10657163)

In Workflow

- 1PS Curriculum Rep
- Curriculum Coordinator
- Activation

Approval Path

- 05/27/21 1:43 pm
Ron Painter (painterron):
Approved for 1PS Curriculum Rep
- 05/27/21 2:22 pm
Mary Vanatta (vanattamary):
Approved for Curriculum Coordinator

Course Proposal Form

Faculty Author: Baba Kofi Weusijana

Effective Term: Summer 2022

Subject: Computer Science (C S) Course Number: F077A

Department: Computer Science (C S)

Division: Physical Sciences, Mathematics & Engineering (1PS)

Units: 4.5

Hours: 4 hours lecture, 2 hours laboratory

Course Title: ADVANCED WEB APPLICATION DEVELOPMENT

Short Title:

Proposed Transferability: CSU Only

Proposed Description and Requisites: Design and develop applications that deliver similar features and functions normally associated with desktop applications using modern Web client and server technologies. Course Advisories: C S 22A, C S 30A, C S 40A, C S 84A, and GID 55.

Proposed Discipline: Computer Science

To which Degree(s) or Certificate(s) would this course potentially be added?
Completion of this course is required for the Web Application Development Certificate and the Advanced Web Application Development Certificate.

Are there any other departments that may be impacted from the addition of this course?

No

Comments & Other Relevant Information for Discussion:
N/A

Reviewer Comments:

Key: 8728

[Preview Bridge](#)
[Why Did This Not Sync?](#)

Course Change Request

New Course Proposal

Date Submitted: 05/15/21 3:58 pm

Viewing: **C S F077B : PROJECTS IN WEB APPLICATION DEVELOPMENT**

Last edit: 05/27/21 2:10 pm

Changes proposed by: Baba Kofi Weusijana (10657163)

In Workflow

- 1PS Curriculum Rep
- Curriculum Coordinator
- Activation

Approval Path

- 05/27/21 1:45 pm
Ron Painter (painterron):
Approved for 1PS Curriculum Rep
- 05/27/21 2:22 pm
Mary Vanatta (vanattamary):
Approved for Curriculum Coordinator

Course Proposal Form

Faculty Author: Baba Kofi Weusijana

Effective Term: Summer 2022

Subject: Computer Science (C S) Course Number: F077B

Department: Computer Science (C S)

Division: Physical Sciences, Mathematics & Engineering (1PS)

Units: 4.5

Hours: 2 hours lecture, 7.5 hours laboratory

Course Title: PROJECTS IN WEB APPLICATION DEVELOPMENT

Short Title:

Proposed Transferability: CSU Only

Proposed Description and Requisites: Team-based applied Web application projects as determined in consultation with the instructor. Students meet at-least once per week with the instructor. Volunteer or work-based learning portfolio, progress reports, oral presentations, final report, teamwork assessments, and evaluation by project supervisor or client will be used to demonstrate the mastery of competencies identified as goals prior to, or near the start of, the project(s). Project work can be within the context of an internship or developing an internship or start-up opportunity. Completion of this capstone course is required for the Web Application Development Certificate and the Advanced Web Application Development Certificate.
Course Prerequisites: C S 77A

Proposed Discipline: Computer Science

To which Degree(s) or Certificate(s) would this course potentially be added?
Web Application Development Certificate and the Advanced Web Application Development Certificate

Are there any other departments that may be impacted from the addition of this course?

No

Comments & Other Relevant Information for Discussion:
N/A

Reviewer
Comments

Course Change Request

New Course Proposal

Date Submitted: 05/17/21 10:51 am

Viewing: **C S F078W : SPECIAL TOPICS IN COMPUTER SCIENCE**

Last edit: 05/28/21 2:27 pm

Changes proposed by: Eric Reed (20176435)

In Workflow

- 1PS Curriculum Rep
- Curriculum Coordinator
- Activation

Approval Path

- 05/27/21 1:47 pm
Ron Painter (painterron):
Approved for 1PS Curriculum Rep
- 05/28/21 2:27 pm
Mary Vanatta (vanattamary):
Approved for Curriculum Coordinator

Course Proposal Form

Faculty Author Eric Reed

Effective Term Summer 2022

Subject Computer Science (C S) Course Number F078W

Department Computer Science (C S)

Division Physical Sciences, Mathematics & Engineering (1PS)

Units 1

Hours 1 Lecture

Course Title SPECIAL TOPICS IN COMPUTER SCIENCE

Short Title

Proposed Transferability CSU Only

Proposed Description and Requisites: Examination of selected topics relating to the Computer Science discipline. Subject matter will vary.

Proposed Discipline Computer Science

To which Degree(s) or Certificate(s) would this course potentially be added? Support course for AS and AS-T in Computer Science

Are there any other departments that may be impacted from the addition of this course? No

Comments & Other Relevant Information for Discussion: This course family is modeled after COMM 78WXYZ at De Anza and is intended for experimental topics that may lead to new courses.

Reviewer Comments

Key: 8732

[Preview Bridge](#)
[Why Did This Not Sync?](#)

Course Change Request

New Course Proposal

Date Submitted: 05/17/21 10:52 am

Viewing: **C S F078X : SPECIAL TOPICS IN COMPUTER SCIENCE**

Last edit: 05/28/21 2:28 pm

Changes proposed by: Eric Reed (20176435)

In Workflow

- 1PS Curriculum Rep
- Curriculum Coordinator
- Activation

Approval Path

- 05/27/21 1:48 pm
Ron Painter (painterron):
Approved for 1PS Curriculum Rep
- 05/28/21 2:28 pm
Mary Vanatta (vanattamary):
Approved for Curriculum Coordinator

Course Proposal Form

Faculty Author Eric Reed

Effective Term Summer 2022

Subject Computer Science (C S) Course Number F078X

Department Computer Science (C S)

Division Physical Sciences, Mathematics & Engineering (1PS)

Units 2

Hours 2 Lecture

Course Title SPECIAL TOPICS IN COMPUTER SCIENCE

Short Title

Proposed Transferability CSU Only

Proposed Description and Requisites: Examination of selected topics relating to the Computer Science discipline. Subject matter will vary.

Proposed Discipline Computer Science

To which Degree(s) or Certificate(s) would this course potentially be added?
Support course for AS and AS-T in Computer Science

Are there any other departments that may be impacted from the addition of this course?

No

Comments & Other Relevant Information for Discussion:

This course family is modeled after COMM 78WXYZ at De Anza and is intended for experimental topics that may lead to new courses.

Reviewer Comments

Key: 8733

[Preview Bridge](#)
[Why Did This Not Sync?](#)

Course Change Request

New Course Proposal

Date Submitted: 05/17/21 10:53 am

Viewing: **C S F078Y : SPECIAL TOPICS IN COMPUTER SCIENCE**

Last edit: 05/28/21 2:28 pm

Changes proposed by: Eric Reed (20176435)

In Workflow

- 1PS Curriculum Rep
- Curriculum Coordinator
- Activation

Approval Path

- 05/27/21 1:49 pm
Ron Painter (painterron):
Approved for 1PS Curriculum Rep
- 05/28/21 2:28 pm
Mary Vanatta (vanattamary):
Approved for Curriculum Coordinator

Course Proposal Form

Faculty Author Eric Reed

Effective Term Summer 2022

Subject Computer Science (C S) Course Number F078Y

Department Computer Science (C S)

Division Physical Sciences, Mathematics & Engineering (1PS)

Units 3

Hours 3 Lecture

Course Title SPECIAL TOPICS IN COMPUTER SCIENCE

Short Title

Proposed Transferability CSU Only

Proposed Description and Requisites: Examination of selected topics relating to the Computer Science discipline. Subject matter will vary.

Proposed Discipline Computer Science

To which Degree(s) or Certificate(s) would this course potentially be added?
Support course for AS and AS-T in Computer Science

Are there any other departments that may be impacted from the addition of this course?

No

Comments & Other Relevant Information for Discussion:

This course family is modeled after COMM 78WXYZ at De Anza and is intended for experimental topics that may lead to new courses.

Reviewer Comments

Key: 8734

[Preview Bridge](#)
[Why Did This Not Sync?](#)

Course Change Request

New Course Proposal

Date Submitted: 05/17/21 10:54 am

Viewing: **C S F078Z : SPECIAL TOPICS IN COMPUTER SCIENCE**

Last edit: 05/28/21 2:28 pm

Changes proposed by: Eric Reed (20176435)

In Workflow

1. **1PS Curriculum Rep**
2. **Curriculum Coordinator**
3. **Activation**

Approval Path

1. 05/27/21 1:49 pm
Ron Painter (painterron):
Approved for 1PS Curriculum Rep
2. 05/28/21 2:28 pm
Mary Vanatta (vanattamary):
Approved for Curriculum Coordinator

Course Proposal Form

Faculty Author Eric Reed

Effective Term Summer 2022

Subject Computer Science (C S) Course Number F078Z

Department Computer Science (C S)

Division Physical Sciences, Mathematics & Engineering (1PS)

Units 4

Hours 4 Lecture

Course Title SPECIAL TOPICS IN COMPUTER SCIENCE

Short Title

Proposed Transferability CSU Only

Proposed Description and Requisites: Examination of selected topics relating to the Computer Science discipline. Subject matter will vary.

Proposed Discipline Computer Science

To which Degree(s) or Certificate(s) would this course potentially be added? Support course for AS and AS-T in Computer Science

Are there any other departments that may be impacted from the addition of this course? No

Comments & Other Relevant Information for Discussion:

This course family is modeled after COMM 78WXYZ at De Anza and is intended for experimental topics that may lead to new courses.

Reviewer
Comments

Key: 8735

[Preview Bridge](#)
[Why Did This Not Sync?](#)

Course Change Request

New Course Proposal

Date Submitted: 05/17/21 10:18 am

Viewing: **C S F203A : JUST-IN-TIME SUPPORT FOR C S 3A**

Last edit: 05/27/21 2:52 pm

Changes proposed by: Eric Reed (20176435)

In Workflow

- 1PS Curriculum Rep
- Curriculum Coordinator
- Activation

Approval Path

- 05/27/21 2:00 pm
Ron Painter (painterron):
Approved for 1PS Curriculum Rep
- 05/27/21 4:04 pm
Mary Vanatta (vanattamary):
Approved for Curriculum Coordinator

Course Proposal Form

Faculty Author Eric Reed

Effective Term Summer 2022

Subject Computer Science (C S) Course Number F203A

Department Computer Science (C S)

Division Physical Sciences, Mathematics & Engineering (1PS)

Units 2.5

Hours 2.5 Lecture

Course Title JUST-IN-TIME SUPPORT FOR C S 3A

Short Title

Proposed Transferability None

Proposed Description and Requisites: A just-in-time approach to the core prerequisite skills, competencies, and concepts needed in C S 3A - Object-Oriented Programming Methodologies in Python. Topics include: navigating through the file structure of an operating system; installing an IDE and other required software; developing a logical approach to writing code; writing and executing a program in Python; testing; debugging, following style conventions, and documenting.
Corequisite: C S 3A

Proposed Discipline Computer Science

To which Degree(s) or Certificate(s) would this course potentially be added?
N/A

Are there any other departments that may be impacted from the addition of this course?
No

Comments & Other Relevant Information for Discussion:
This course follows the philosophy of MATH 248A, offering extra support for students who are starting C S 3A without a solid background in computer science.

Reviewer Comments

Key: 8730

[Preview Bridge](#)
[Why Did This Not Sync?](#)

Course Change Request

New Course Proposal

Date Submitted: 05/25/21 10:32 am

Viewing: **ENGL F010A : LITERATURE & THE ENVIRONMENT**

Last edit: 05/26/21 11:00 am

Changes proposed by: Amber La Piana (20336104)

In Workflow

1. 1LA Curriculum Rep
2. Curriculum Coordinator
3. Activation

Approval Path

1. 05/25/21 10:26 am
Mary Vanatta (vanattamary): Rollback to Initiator
2. 05/25/21 4:23 pm
Allison Herman (hermanallison): Approved for 1LA Curriculum Rep
3. 05/26/21 11:02 am
Mary Vanatta (vanattamary): Approved for Curriculum Coordinator

Course Proposal Form

Faculty Author Amber La Piana

Effective Term Summer 2022

Subject English (ENGL) Course Number F010A

Department English (ENGL)

Division Language Arts (1LA)

Units 4

Hours 4 hours lecture

Course Title LITERATURE & THE ENVIRONMENT

Short Title

Proposed Transferability UC/CSU

Proposed Description and Requisites: Ecocritical study of texts across historical periods, geopolitical borders, aesthetic movements and philosophical traditions. Includes scientific and theoretical considerations of the evolving dynamics between nature and culture and the human and non-human. Examines the role of literature in reflecting, shaping, and constructing perceptions and experiences of built and natural environments as well as the relationship between literature and activism. Emphasis on the connection between environmental justice and intersectional factors such as race, ethnicity, gender, sexuality, class, dis/ability, citizenship, geography, and species.

Advisory: Demonstrated proficiency in English by placement via multiple measures OR through an equivalent placement process OR completion of ESLL 125 & ESLL 249.

Proposed Discipline English

To which Degree(s) or Certificate(s) would this course potentially be added?

English

May be a good GE course for:

Biological Sciences
Environmental & Horticultural Design
Environmental Science
General Studies - Science
Geographic Information Systems Technology
Geography
Global Studies
Social Justice
Veterinary Tech

Are there any other departments that may be impacted from the addition of this course?

No

Comments & Other Relevant Information for Discussion:

N/A

Course Change Request

New Course Proposal

Date Submitted: 05/17/21 11:00 am

Viewing: **NCBS F443A : JUST-IN-TIME SUPPORT FOR C S 3A**

Last edit: 05/27/21 3:49 pm

Changes proposed by: Eric Reed (20176435)

In Workflow

- 1PS Curriculum Rep
- Curriculum Coordinator
- Activation

Approval Path

- 05/27/21 2:01 pm
Ron Painter (painterron):
Approved for 1PS Curriculum Rep
- 05/27/21 4:04 pm
Mary Vanatta (vanattamary):
Approved for Curriculum Coordinator

Course Proposal Form

Faculty Author Eric Reed

Effective Term Summer 2022

Subject Non-Credit: Basic Skills (NCBS) Course Number F443A

Department Computer Science (C S)

Division Physical Sciences, Mathematics & Engineering (1PS)

Units 0

Hours 2.5 Lecture

Course Title JUST-IN-TIME SUPPORT FOR C S 3A

Short Title

Proposed Transferability None

Proposed Description and Requisites: A just-in-time approach to the core prerequisite skills, competencies, and concepts needed in C S 3A - Object-Oriented Programming Methodologies in Python. Topics include: navigating through the file structure of an operating system; installing an IDE and other required software; developing a logical approach to writing code; writing and executing a program in Python; testing; debugging, following style conventions, and documenting.
Corequisite: C S 3A

Proposed Discipline Computer Science

To which Degree(s) or Certificate(s) would this course potentially be added? None

Are there any other departments that may be impacted from the addition of this course? No

Comments & Other Relevant Information for Discussion:
This is intended to be a non-credit mirrored version of proposed course C S 203A.

Reviewer
Comments

Key: 8736

[Preview Bridge](#)
[Why Did This Not Sync?](#)

Foothill College
Credit Program Narrative
Associate in Science in Biochemistry

Item 1. Program Goals and Objectives

Biochemistry graduates will find an impressive array of opportunities for exciting careers in a wide range of fields due to their coursework in chemistry and biology. Potential careers include basic research, pharmaceuticals, biotechnology, forensic science, food science, environmental protection, new product and process development, and education. Aside from careers in research and development in the chemical industry, there is a need for technically trained people in non-traditional areas such as marketing and sales, scientific information, patent law, health and safety, and handling of hazardous materials. Academic careers for biochemists include university teaching and science teaching in secondary schools, an area that will expand greatly in the future. A bachelor's degree can also provide a strong foundation for graduate study at medical, dental, veterinary, and pharmacy schools. Students with biochemistry degrees have been notably successful in these areas.

Program Learning Outcomes:

- Students will have knowledge of current theories and applications in the fields of chemistry and biology.
- Students will demonstrate skill in researching, assessing and evaluating topics of interest.
- Students will communicate effectively using the language of chemistry.
- Students will have facility in the safe handling of chemicals and the execution of common chemistry and biology laboratory techniques.

Item 2. Catalog Description

The major in biochemistry is primarily intended for students who plan to transfer to a four-year institution to earn a bachelor's degree. Students who graduate with a bachelor's degree in biochemistry will be able to pursue a wide range of career opportunities in chemistry, biology, and related fields. In addition, biochemistry majors will take coursework similar to that required for admission to medical, dental, veterinary, and pharmacy schools.

Item 3. Program Requirements

Requirements	Course #	Title	Units	Sequence
Core Courses (60-62 units)	CHEM 1A	General Chemistry	5	Year 1, Fall
	OR CHEM 1AH	Honors General Chemistry	5	Year 1, Fall
	CHEM 1B	General Chemistry	5	Year 1, Winter
	OR CHEM 1BH	Honors General Chemistry	5	Year 1, Winter
	CHEM 1C	General Chemistry & Qualitative Analysis	5	Year 1, Spring

	CHEM 12A	Organic Chemistry	4	Year 2, Fall
	CHEM 12AL	Organic Chemistry Laboratory	2	Year 2, Fall
	CHEM 12B	Organic Chemistry	4	Year 2, Winter
	CHEM 12BL OR	Organic Chemistry Laboratory	2	Year 2, Winter
	CHEM 13BH	Honors Organic Chemistry Laboratory	3	Year 2, Winter
	CHEM 12C	Organic Chemistry	4	Year 2, Spring
	CHEM 12CL OR	Organic Chemistry Laboratory	2	Year 2, Spring
	CHEM 13CH	Honors Organic Chemistry Laboratory	3	Year 2, Spring
	And 3 of the following:			
	MATH 1A OR	Calculus	5	Year 1, Fall
	MATH 1AH	Honors Calculus I	5	Year 1, Fall
	MATH 1B OR	Calculus	5	Year 1, Winter
	MATH 1BH	Honors Calculus II	5	Year 1, Winter
	MATH 1C	Calculus	5	Year 1, Spring
	MATH 1D	Calculus	5	Year 2, Fall
	MATH 2A	Differential Equations	5	Year 2, Winter
	And 2 of the following:			
	BIOL 1A	Principles of Cell Biology	6	Year 2, Fall
	BIOL 1B	Form & Function in Plants & Animals	6	Year 2, Winter
	BIOL 1C	Evolution, Systematics & Ecology	6	Year 2, Spring

TOTAL UNITS: 60-62 units

Proposed Sequence:

Year 1, Fall = 10 units

Year 1, Winter = 10 units

Year 1, Spring = 10 units

Year 2, Fall = 12 units

Year 2, Winter = 12-13 units

Year 2, Spring = 6-7 units

TOTAL UNITS: 60-62 units**Item 4. Master Planning**

Biochemistry is one of the fastest-growing disciplines within chemistry where biochemists play a key role in pharmaceutical and medical science research and development. In addition, the San Francisco Bay Area is a hub for medical technology and biotechnology in general. Students who graduate from Foothill College with a degree in biochemistry would be adequately prepared for transfer to a bachelor's program in a four-year institution where they could complete their training and join the workforce. Moreover, Foothill College is engaged in several initiatives that aim to increase the number of underrepresented populations in STEM fields. There is a great need for increased diversity in STEM disciplines, including biochemistry. A degree program at Foothill would be attractive to many students and encourage them to pursue careers in this exciting discipline. Finally, many students enroll in chemistry and biology courses to fulfill requirements for medical, dental, veterinary, and pharmacy school. Offering a degree in biochemistry would enable them to complete a substantial part of their preparations towards this career goal.

Item 5. Enrollment and Completer Projections

We estimate 30 students a year would complete the requirements for the Biochemistry AS degree, which is equivalent to 150 students over five years. This is based on historical enrollment in, and completion of, the CHEM 12 series as well as an estimate of the number of CHEM 12 students who are concurrently enrolled in biology courses.

Course #	Course Title	Year 1 – 2018-2019		Year 2 – 2019-2020	
		Annual Sections	Annual Enrollment	Annual Sections	Annual Enrollment
CHEM 1A/ 1AH	General Chemistry/ Honors General Chemistry	18	480	18	461
CHEM 1B/ 1BH	General Chemistry/ Honors General Chemistry	14	328	13	313
CHEM 1C	General Chemistry & Qualitative Analysis	9	213	8	186
CHEM 12A	Organic Chemistry	3	146	3	113
CHEM 12AL	Organic Chemistry Laboratory	6	133	5	99

CHEM 12B	Organic Chemistry	3	123	3	83
CHEM 12BL/ 13BH	Organic Chemistry Laboratory/Honors Organic Chemistry Laboratory	5	105	4	76
CHEM 12C	Organic Chemistry	3	74	4	86
CHEM 12CL/ 13CH	Organic Chemistry Laboratory/Honors Organic Chemistry Laboratory	4	71	4	81
MATH 1A	Calculus	25	959	24	914
MATH 1AH	Honors Calculus I	0	0	1	43
MATH 1B/ 1BH	Calculus/Honors Calculus II	21	754	22	839
MATH 1C	Calculus	13	500	18	606
MATH 1D	Calculus	10	314	10	322
MATH 2A	Differential Equations	7	238	7	246
BIOL 1A	Principles of Cell Biology	8	193	9	210
BIOL 1B	Form & Function in Plants & Animals	5	156	7	141
BIOL 1C	Evolution, Systematics & Ecology	4	118	4	110

Item 6. Place of Program in Curriculum/Similar Programs

The Biochemistry AS degree program is designed to be complementary to the existing Chemistry AS degree program, where this program requires two biology courses rather than two physics courses. In addition, the Biochemistry AS degree program is different from the Biological Sciences AS degree program and the Biology AS-T program, in that neither of the latter programs have organic chemistry or calculus as core program requirements. The increased coursework within the Biochemistry AS degree relative to other local degrees is more aligned with the lower-division coursework required for Biochemistry BS degree programs at four-year institutions.

Item 7. Similar Programs at Other Colleges in Service Area

Most community colleges in Foothill's service area either do not offer a chemistry degree at all or offer a chemistry degree without biology as a core requirement. Likewise, most community colleges offer various biology degrees but are missing organic chemistry as a core program requirement.

Three exceptions were found, however:

- City College of San Francisco offers a six-semester Biology AS degree that covers the same biology, chemistry, and math requirements as this degree.
- Ohlone College offers a Biology AS degree with the same core requirements as this degree, but with only one semester of calculus instead of two.
- Las Positas College offers a Biology UC Pathway AS degree with the same core requirements as this degree program.

Additional Information Required for State Submission:

TOP Code: 1905.00 – Chemistry, General

Annual Completers: 30

Faculty Workload: 1.333

New Faculty Positions: 0

New Equipment: \$0

New/Remodeled Facilities: \$0

Library Acquisitions: \$0

Gainful Employment: Yes

Program Review Date: Summer, 2027

Distance Education: 0%

Articulation Agreement by Major

Effective during the 2020-2021 Academic Year

To: California Polytechnic University, San Luis Obispo
2020-2021 General Catalog, Quarter

From: Foothill College
2020-2021 General Catalog, Quarter

BIOCHEMISTRY, B.S.

TRANSFER INFORMATION & ONLINE RESOURCES

WHAT COURSE CREDIT WILL TRANSFER FOR THIS MAJOR?

This view is By Major and shows lower division courses within BS Biochemistry for the academic year (Fall to Summer) 2020-2021 – these are listed to the left, with articulated courses from the sending institution listed to the right. Where combinations of courses exist, some duplication may occur.

Courses are listed under three sections: **Major Courses**, **Support Courses** and **Other Courses**. All students in the major will take **Major and Support Courses**. Courses that are either in Concentrations, Areas of Emphasis or an Elective for the major are grouped in the **Other Courses** section. As a result, this section will vary in capacity and not all courses listed may be relevant to the course of study being pursued. Resources are provided below to confirm the exact lower division courses required.

Upper Division, General Education (GE) and free elective coursework are not listed here.

Both GE and course credit are awarded when an incoming articulated course is approved for GE. Where articulation is established but the transfer course is not approved for GE, only course credit is awarded.

As noted at the top of this agreement, Cal Poly SLO is on the Quarter system – all Cal Poly course units will reflect this.

WHAT COURSES NEED TO BE TAKEN TO BE A COMPETITIVE TRANSFER APPLICANT?

Not all the articulated courses listed below are required to be a competitive transfer applicant for this major.

It is ESSENTIAL that transfer applicants first review the Admissions webpages concerning Selection Criteria for Transfer Students and Major Specific Transfer Criteria.

Selection Criteria for Transfer Students can be found here:

<http://admissions.calpoly.edu/applicants/transfer/criteria.html>

Major Specific Transfer Criteria is linked from the Selection Criteria page, and indicates both required and recommended coursework. Applicants should take note of these courses, and refer to their potential articulation in ASSIST through either Articulation Agreements by Major, by Department or by Prefix. Credit is extended based on the academic year in which the transfer course was taken.

RESOURCES TO USE WITH ASSIST

ASSIST only provides certain information; use the resources below for a more complete overview of this major.

[2020-2021 Catalog](http://catalog.calpoly.edu/) information on BS Biochemistry can be found here: <http://catalog.calpoly.edu/>

The [Curriculum Sheet](http://flowcharts.calpoly.edu) for BS Biochemistry can be found here: <http://flowcharts.calpoly.edu>

This is not a static document; new articulation may be added at any time. The information provided herein is subject to change without notice and does not constitute a contract or the terms and conditions of a contract between the student and the institution or the California State University.

NOTE CONCERNING "OTHER COURSES" SECTION FOR THIS MAJOR

- This major offers the choice of either 12 units of Advanced Biochemistry electives or 18 units of Polymers and Coatings concentration. Lower division course is listed.
- This major has no areas of emphasis.
- Although not listed here, this major has 9-16 units of free electives.

MAJOR COURSES

CHEM 124 - General Chemistry for Physical Science and Engineering I (4.00) ←

CHEM 1A - General Chemistry (5.00)

--- Or ---

CHEM 1AH - Honors General Chemistry (5.00)

CHEM 125 - General Chemistry for Physical Science and Engineering II (4.00) ←

CHEM 1B - General Chemistry (5.00)

--- Or ---

CHEM 1BH - Honors General Chemistry (5.00)

CHEM 126 - General Chemistry for Physical Science and Engineering III (4.00) ←

CHEM 1C - General Chemistry & Qualitative Analysis (5.00)

CHEM 216 - Organic Chemistry I (5.00)	← No Course Articulated
CHEM 217 - Organic Chemistry II (4.00)	← No Course Articulated
CHEM 218 - Organic Chemistry III (3.00)	← No Course Articulated
<div style="border: 1px solid black; padding: 5px;"> CHEM 216 - Organic Chemistry I (5.00) <div style="background-color: #cccccc; text-align: center; padding: 2px;">--- And ---</div> CHEM 217 - Organic Chemistry II (4.00) </div>	←
	<div style="border: 1px solid black; padding: 5px;"> CHEM 12A - Organic Chemistry (4.00) <div style="background-color: #cccccc; text-align: center; padding: 2px;">--- And ---</div> CHEM 12B - Organic Chemistry (4.00) <div style="background-color: #cccccc; text-align: center; padding: 2px;">--- And ---</div> CHEM 12C - Organic Chemistry (4.00) </div>
<div style="border: 1px solid black; padding: 5px;"> CHEM 216 - Organic Chemistry I (5.00) <div style="background-color: #cccccc; text-align: center; padding: 2px;">--- And ---</div> CHEM 217 - Organic Chemistry II (4.00) <div style="background-color: #cccccc; text-align: center; padding: 2px;">--- And ---</div> CHEM 218 - Organic Chemistry III (3.00) </div>	←
	<div style="border: 1px solid black; padding: 5px;"> CHEM 12A - Organic Chemistry (4.00) <div style="background-color: #cccccc; text-align: center; padding: 2px;">--- And ---</div> CHEM 12B - Organic Chemistry (4.00) <div style="background-color: #cccccc; text-align: center; padding: 2px;">--- And ---</div> CHEM 12C - Organic Chemistry (4.00) </div>
CHEM 221 - Organic Chemistry Laboratory II (2.00)	← No Course Articulated

SUPPORT COURSES

BIO 161 - Introduction to Cell and Molecular Biology (4.00)	← BIOL 1A - Principles of Cell Biology (6.00)
MATH 141 - Calculus I (4.00) Same-As: HNRS 141	← MATH 1A - Calculus (5.00) <div style="background-color: #cccccc; text-align: center; padding: 2px;">--- Or ---</div> MATH 1AH - Honors Calculus I (5.00)
MATH 142 - Calculus II (4.00) Same-As: HNRS 142	← MATH 1B - Calculus (5.00)
MATH 143 - Calculus III (4.00) Same-As: HNRS 143	← MATH 1C - Calculus (5.00)
<div style="border: 1px solid black; padding: 5px;"> MATH 141 - Calculus I (4.00) Same-As: HNRS 141 <div style="background-color: #cccccc; text-align: center; padding: 2px;">--- And ---</div> MATH 142 - Calculus II (4.00) Same-As: HNRS 142 </div>	←
	<div style="border: 1px solid black; padding: 5px;"> MATH 1A - Calculus (5.00) <div style="background-color: #cccccc; text-align: center; padding: 2px;">--- And ---</div> MATH 1B - Calculus (5.00) </div>
<div style="border: 1px solid black; padding: 5px;"> MATH 141 - Calculus I (4.00) Same-As: HNRS 141 <div style="background-color: #cccccc; text-align: center; padding: 2px;">--- And ---</div> MATH 142 - Calculus II (4.00) Same-As: HNRS 142 <div style="background-color: #cccccc; text-align: center; padding: 2px;">--- And ---</div> MATH 143 - Calculus III (4.00) Same-As: HNRS 143 </div>	←
	<div style="border: 1px solid black; padding: 5px;"> MATH 1A - Calculus (5.00) <div style="background-color: #cccccc; text-align: center; padding: 2px;">--- And ---</div> MATH 1B - Calculus (5.00) <div style="background-color: #cccccc; text-align: center; padding: 2px;">--- And ---</div> MATH 1C - Calculus (5.00) </div>
MCRO 224 - General Microbiology I (5.00)	← BIOL 41 - Microbiology (6.00)
PHYS 141 - General Physics IA (4.00) Same-As: HNRS 134	← PHYS 4A - General Physics (Calculus) (6.00)
PHYS 132 - General Physics II (4.00) Same-As: HNRS 132	← PHYS 4C - General Physics (Calculus) (6.00)
PHYS 133 - General Physics III (4.00)	← PHYS 4B - General Physics (Calculus) (6.00)
<div style="border: 1px solid black; padding: 5px;"> PHYS 141 - General Physics IA (4.00) Same-As: HNRS 134 <div style="background-color: #cccccc; text-align: center; padding: 2px;">--- And ---</div> PHYS 132 - General Physics II (4.00) Same-As: HNRS 132 <div style="background-color: #cccccc; text-align: center; padding: 2px;">--- And ---</div> PHYS 133 - General Physics III (4.00) </div>	←
	<div style="border: 1px solid black; padding: 5px;"> PHYS 4A - General Physics (Calculus) (6.00) <div style="background-color: #cccccc; text-align: center; padding: 2px;">--- And ---</div> PHYS 4C - General Physics (Calculus) (6.00) <div style="background-color: #cccccc; text-align: center; padding: 2px;">--- And ---</div> PHYS 4B - General Physics (Calculus) (6.00) </div>

OTHER COURSES (CONCENTRATION/EMPHASIS/ELECTIVES)

****REFER TO TOP OF AGREEMENT****

****REFER TO CATALOG****

CHEM 252 - Laboratory Glassblowing (1.00)

← No Course Articulated

END OF AGREEMENT

Articulation Agreement by Major

Effective during the 2020-2021 Academic Year

To: California State University, East Bay
2020-2021 General Catalog, Semester

From: Foothill College
2020-2021 General Catalog, Quarter

Biochemistry, B.S.

PLEASE NOTE: ASSIST Next Gen is a new system and does not replace the assistance of meeting with an adviser. Please contact AACE at (510) 885-3621 for an advising appointment. The most accurate and up to date transfer information for CSU East Bay is available at this link: [CSUEB Equivalencies](#)

All California Community College transfer students are encouraged to complete their CSU General Education pattern at their Community College prior to enrollment at CSU, East Bay.

BIOCHEMISTRY, B.S. PROGRAM (120 UNITS)

Program Description

The Department of Chemistry and Biochemistry provides a strong education in chemistry and biochemistry that prepares its students to function and thrive in our society. The department attempts to increase the problem solving and critical thinking skills of all students. Non-science students learn about the scientific and chemical aspects of everyday life that allow them to understand issues related to the environment, energy production, disease prevention, and nutrition. Students of the sciences learn the fundamentals of chemistry that control the interactions of elements and molecules which form the building blocks in nature. Chemistry majors receive extensive instruction in predicting chemical reactivity. Building on an understanding of mathematics, physics, and biology, chemistry majors receive a background in the major disciplines of chemistry including inorganic, analytical, organic, physical, and biochemistry. Students learn the protocols and techniques for working safely with chemicals. The department recognizes the importance of the pursuit of new knowledge in the development of skilled scientists and productive members of society, and encourages its students to participate in research projects and cooperative educational opportunities.

The undergraduate programs offered by the department include: [Chemistry, B.S.](#); [Biochemistry, B.S.](#); [Chemistry, Forensic Science Option, B.S.](#); [Chemistry, B.A.](#); [Chemistry, Chemistry Education Option, B.A.](#); [Biochemistry, B.A.](#); [Biochemistry, Chemistry Education Option, B.A.](#); and a [Chemistry Minor](#). Descriptions of these programs and their requirements are listed below. (See the [Department of Chemistry and Biochemistry \(Graduate\)](#) for descriptions of the department's [Chemistry, M.S.](#) and M.S. Option in Biochemistry.)

The [Chemistry, B.S.](#) degree is approved by the American Chemical Society (ACS). A certified degree is a valuable credential that serves as national-level recognition for completing a rigorous academic chemistry curriculum in an ACS-approved department. The extra rigor of an ACS certified degree is valued by both potential employers and graduate schools.

Degree Requirements Unit-Outline

- A baccalaureate of science degree requires a total of 120 units:
 - The major requirements consists of 75 units;
 - General Education (GE) & Graduation Requirements (GR) consists of 57 units;
 - Free Electives may consist of 0 units (actual # of free elective units may depend on GE/GR units).

Note: It may be possible to double-count units within the graduation requirements or that a course may satisfy both a graduation requirement and a major requirement. Students should contact their transfer advisors for information.

LOWER DIVISION CORE

BIOL 140A - Principles of Cell and Molecular Biology (5.00)

--- And ---

BIOL 140B - Principles of Organismal Biology (5.00)



BIOL 1A - Principles of Cell Biology (6.00)

--- And ---

BIOL 1B - Form & Function in Plants & Animals (6.00)

--- And ---

BIOL 1C - Evolution, Systematics & Ecology (6.00)

CHEM 111 - GENERAL CHEMISTRY I (5.00)

--- And ---

CHEM 112 - GENERAL CHEMISTRY II (5.00)



CHEM 1A - General Chemistry (5.00)

--- And ---

CHEM 1B - General Chemistry (5.00)

--- And ---

CHEM 1C - General Chemistry & Qualitative Analysis (5.00)

--- Or ---

CHEM 111 - GENERAL CHEMISTRY I (5.00)

- *Articulates as a sequence only*

← Articulates as a Series Only

--- And ---

CHEM 112 - GENERAL CHEMISTRY II (5.00)

- *Articulates as a sequence only*

← Articulates as a Series Only

CHEM 220 - QUANTITATIVE ANALYSIS (4.00)

← No Course Articulated

MATH 130 - CALCULUS I (4.00)

--- And ---

MATH 131 - CALCULUS II (3.00)

--- And ---

MATH 230 - CALCULUS III (3.00)

←

MATH 1A - Calculus (5.00)

--- And ---

MATH 1B - Calculus (5.00)

--- And ---

MATH 1C - Calculus (5.00)

--- And ---

MATH 1D - Calculus (5.00)

--- Or ---

MATH 130 - CALCULUS I (4.00)

← **MATH 1A** - Calculus (5.00)

--- And ---

MATH 131 - CALCULUS II (3.00)

← **MATH 1B** - Calculus (5.00)

--- And ---

MATH 230 - CALCULUS III (3.00)

←

MATH 1C - Calculus (5.00)

--- And ---

MATH 1D - Calculus (5.00)

PHYS 135 - Physics for Scientists and Engineers I (4.00)

← Articulates as a Series Only

PHYS 136 - Physics for Scientists and Engineers II (4.00)

← Articulates as a Series Only

END OF AGREEMENT

Articulation Agreement by Major

Effective during the 2020-2021 Academic Year

To: San Francisco State University
2020-2021 General Catalog, Semester

From: Foothill College
2020-2021 General Catalog, Quarter

Biochemistry, B.S.

IMPACTION UPDATE

Effective Fall 2020, impaction status for the B.S. Biochemistry program is discontinued. Regular admission criteria in effect for those applying for the Fall 2020 term and beyond.

ASSOCIATE DEGREE FOR TRANSFER INFORMATION

The AS-T in Chemistry (SB 1440 degree) is an approved transfer pathway for this major. Visit [SF State ADT Pathways and Roadmaps](#) for a list of all approved ADT pathways for SF State degree programs and to view sample post-transfer advising roadmaps for each pathway.

Students preparing to transfer into this major at SF State should complete any available articulated courses in the Requirement Information section(s) below. Completion of the American Institutions requirement (US-1, US-2, US-3) before transfer is also strongly recommended.

PREPARATION NOTE

Completion of a course articulated to CHEM 115 is recommended before transfer.

Note that all students are required to take a department-administered placement exam for CHEM 115 at SF State. *Students may enroll for CHEM 115 prior to taking the exam.* This exam is offered on two dates prior to the start of each semester. [More information about the placement exam here.](#)

EXTERNAL EXAMINATION CREDIT

Credit for Advanced Placement available for students in this major with qualifying scores. [More information here.](#)

UPPER DIVISION COURSE REQUIREMENT INFORMATION

This agreement involves articulation of lower division coursework completed at a transfer institution with upper division major requirements at SF State. If taken before transfer, the requirement in the major at SF State has been met. However, units earned for lower division courses taken before transfer will not be used to satisfy minimum **upper division** unit requirements for the major or the degree at SF State.

CATALOG INFORMATION

San Francisco State University Bulletin (catalog): bulletin.sfsu.edu

- **Academic Programs:** Major and minor programs
- **Undergraduate Education:** GE and other graduation requirements; AP/IB/CLEP
- **Course Index:** Course descriptions

CONTACT

Visit the department [website](#)

Questions regarding articulation: artic@sfsu.edu

LOWER DIVISION MAJOR REQUIREMENTS

Must be taken for a letter grade
Minimum grade required: C or better

BIOL 230 - Introductory Biology I (5.00)

← **BIOL 1A** - Principles of Cell Biology (6.00)

CHEM 115 - General Chemistry I: Essential Concepts of Chemistry (5.00)

←

CHEM 1A - General Chemistry (5.00)

--- And ---

CHEM 1B - General Chemistry (5.00)

--- Or ---

CHEM 1A - General Chemistry (5.00)

--- And ---

CHEM 1BH - Honors General Chemistry (5.00)

--- Or ---

CHEM 1AH - Honors General Chemistry (5.00)

--- And ---

CHEM 1BH - Honors General Chemistry (5.00)

--- Or ---

CHEM 1AH - Honors General Chemistry (5.00)

--- And ---

CHEM 1B - General Chemistry (5.00)

CHEM 215 - General Chemistry II: Quantitative Applications of Chemistry Concepts (3.00)

←

CHEM 1B - General Chemistry (5.00)

--- And ---

CHEM 1C - General Chemistry & Qualitative Analysis (5.00)

--- Or ---

CHEM 1BH - Honors General Chemistry (5.00)

--- And ---

CHEM 1C - General Chemistry & Qualitative Analysis (5.00)

CHEM 216 - General Chemistry II Laboratory: Quantitative Applications of Chemistry Concepts (2.00)

←

CHEM 1B - General Chemistry (5.00)

--- And ---

CHEM 1C - General Chemistry & Qualitative Analysis (5.00)

--- Or ---

CHEM 1BH - Honors General Chemistry (5.00)

--- And ---

CHEM 1C - General Chemistry & Qualitative Analysis (5.00)

CHEM 233 - Organic Chemistry I (3.00)

←

CHEM 12A - Organic Chemistry (4.00)

--- And ---

CHEM 12B - Organic Chemistry (4.00)

CHEM 234 - Organic Chemistry I Laboratory (2.00)

←

CHEM 12AL - Organic Chemistry Laboratory (2.00)

--- And ---

CHEM 12BL - Organic Chemistry Laboratory (2.00)

--- Or ---

CHEM 13AH - Honors Organic Chemistry Laboratory (3.00)

--- And ---

CHEM 13BH - Honors Organic Chemistry Laboratory (3.00)

CHEM 335 - Organic Chemistry II (3.00)

- ****REFER TO TOP OF AGREEMENT****
- *Content credit only*



CHEM 12B - Organic Chemistry (4.00)

--- And ---

CHEM 12C - Organic Chemistry (4.00)

- *Lower division credit only*
- *No upper division credit*

MATH 226 - Calculus I (4.00)



MATH 1A - Calculus (5.00)

--- And ---

MATH 1B - Calculus (5.00)

--- Or ---

MATH 1AH - Honors Calculus I (5.00)

--- And ---

MATH 1B - Calculus (5.00)

--- Or ---

MATH 1A - Calculus (5.00)

--- And ---

MATH 1BH - Honors Calculus II (5.00)

--- Or ---

MATH 1AH - Honors Calculus I (5.00)

--- And ---

MATH 1BH - Honors Calculus II (5.00)

MATH 227 - Calculus II (4.00)



MATH 1B - Calculus (5.00)

--- And ---

MATH 1C - Calculus (5.00)

--- Or ---

MATH 1BH - Honors Calculus II (5.00)

--- And ---

MATH 1C - Calculus (5.00)

Select 1 Sequence from the following

PHYS 111 - General Physics I (3.00)



PHYS 2A - General Physics (5.00)

--- And ---

PHYS 2B - General Physics (5.00)

PHYS 112 - General Physics I Laboratory (1.00)



PHYS 2A - General Physics (5.00)

--- And ---

PHYS 2B - General Physics (5.00)

PHYS 121 - General Physics II (3.00)



PHYS 2B - General Physics (5.00)

--- And ---

PHYS 2C - General Physics (5.00)

PHYS 122 - General Physics II Laboratory (1.00)



PHYS 2B - General Physics (5.00)

--- And ---

PHYS 2C - General Physics (5.00)

--- Or ---

PHYS 220 - General Physics with Calculus I (3.00)

← **PHYS 4A** - General Physics (Calculus) (6.00)

PHYS 222 - General Physics with Calculus I Laboratory (1.00)

← **PHYS 4A** - General Physics (Calculus) (6.00)

PHYS 240 - General Physics with Calculus III (3.00)

← **PHYS 4C** - General Physics (Calculus) (6.00)

PHYS 242 - General Physics with Calculus III Laboratory (1.00)

← **PHYS 4C** - General Physics (Calculus) (6.00)

END OF AGREEMENT

Articulation Agreement by Major

Effective during the 2020-2021 Academic Year

To: University of California, Berkeley
2020-2021 General Catalog, Semester

From: Foothill College
2020-2021 General Catalog, Quarter

Chemical Biology, Lower Division B.S.

COLLEGE ADMISSION REQUIREMENTS

The major in **Chemical Biology** is offered by the College of Chemistry. The major provides an understanding of the chemical principles of biological function by emphasizing the development of a solid background in chemistry. In addition to an introductory set of math and physics courses and a broad selection of the same chemistry courses required for the chemistry major, students pursuing the chemical biology major take general and cell biology, biochemistry, biological macromolecular synthesis, and bioinorganic chemistry. The curriculum highlights organic chemistry, quantitative thermodynamics, and kinetics, subjects necessary for understanding the logic of biological systems. The Chemical Biology major is intended for students who are interested in careers as professional chemists, or in the biological sciences including the biomedical, biotechnology, and pharmaceutical industries.

Please note that Chemical Biology is distinct from Biochemistry. Biochemistry at UC Berkeley is an emphasis within the Molecular and Cell Biology major, housed in the College of Letters and Science. For a detailed understanding of distinctions between Chemical Biology and Molecular & Cell Biology, review and compare upper-division course requirements and descriptions for both majors.

Transfer applicants are expected to complete, at a minimum, coursework equivalent to Berkeley's:

CHEMISTRY 1A + 1AL + 1B + 3A + 3AL + 3B + 3BL
MATH 1A + 1B + 53
PHYSICS 7A or 8A
ENGLISH R1A + R1B

Coursework must be completed by the end of the spring term that precedes fall enrollment at Berkeley.

IGETC is not required. Students who choose to complete the entire IGETC pattern by the end of the spring term preceding fall enrollment at Berkeley may use IGETC to fulfill the Reading and Composition and Language Other Than English (LOTE) Requirements.

Lower division courses required for graduation (but not for admission) are also listed in this articulation agreement. Completion of those courses is strongly recommended in order to strengthen one's application. All major courses must be taken for a letter grade. High grades in major courses (B and A grades exclusively) are essential for applicants to be both competitive in the admissions process and to be adequately prepared to continue with junior year coursework at Berkeley.

The applicant's personal statement is important in the admissions process. The personal statement is reviewed for evidence of the student's interest in the chosen field and a thoughtful match between the intended major and academic and career objectives.

For more information on College of Chemistry policies and degree programs:

<https://chemistry.berkeley.edu/ugrad/degrees>

For more information on admission to UC Berkeley:

<https://admissions.berkeley.edu>

For more information on majors at UC Berkeley:

Berkeley Academic Guide: <http://guide.berkeley.edu>

Additional questions about transferring to the College of Chemistry may be addressed to:

Maura Daly, Director of Undergraduate Student Services
mdaly@berkeley.edu
(510) 643-0550

ADDITIONAL REQUIREMENTS

Chemical Biology majors who transfer without having covered analytical chemistry are required to take CHEM 105 after transfer.

ORGANIC CHEMISTRY

CHEM 12A + 12B (organic chemistry) are required for the Chemical Biology B.S. degree.

Completion of CHEM 3A + 3AL + 3B + 3BL combined with a score in the 75th percentile or higher on the American Chemical Society (ACS) Organic Chemistry Exam will constitute satisfactory completion of Berkeley's CHEM 12A + 12B. Students are encouraged to take the exam through their community college, if possible.

NOTE: The College of Chemistry does not accept results from the 1994 and 1998 versions of the ACS Organic Chemistry Exam.

PHYSICS

PHYSICS 7C is not required for the Chemical Biology major, but it is acceptable toward the 7-Unit Upper Division Chemistry and

Allied Subjects Requirement.

READING AND COMPOSITION REQUIREMENT

Coursework equivalent to Berkeley's: English R1A + R1B; or

Entire IGETC pattern completed **by the end of the spring term preceding fall enrollment at Berkeley.**

You may also satisfy this requirement with a score/grade of:

4 or 5 on the AP exam in English Language and Composition satisfies ENGLISH R1A;

4 on the AP exam in English Literature and Composition satisfies ENGLISH R1A;

5 on the AP exam in English Literature and Composition satisfies ENGLISH R1A + R1B.

LANGUAGE OTHER THAN ENGLISH (LOTE) REQUIREMENT

The LOTE may be satisfied after transfer, but it should be satisfied by the end of the student's third (junior) year.

To satisfy this Requirement:

Complete a course equivalent to the third year of a language other than English in high school with a grade of C- or higher, or the second semester of a language other than English as taught at Berkeley; or

Complete the entire IGETC pattern by the end of the spring term preceding fall enrollment at Berkeley; or

You may satisfy this Requirement with a score/grade of:

550 on the SAT Subject Test, Language Other Than English, if taken before May 1995;

590 on the SAT II Subject Exam, if taken May 1995 or later;

3 or better on the Foreign Language AP Exam;

C or better on the GCE A-level or I/GCSE O-level Exam in a language other than English;

1-5 on the Foreign Service Institute (FSI) or Defense Language Institute (DLI) exam;

5 or better on the International Baccalaureate in the following exams:

Language (*other than English*) acquisition:

B Standard Level (SL)

B Higher Level (HL)

Studies in language (*other than English*) and literature:

A: literature Standard Level (SL)

A: literature Higher Level (HL)

A: language and literature Standard Level (SL)

A: language and literature Higher Level (HL)

OR

Courses that satisfy Language Other Than English requirement - See list of approved (FL-Foreign Language) courses below. (May be taken for a letter grade or pass/no pass.)

AP EXAM CREDIT

BIOLOGY

You may also satisfy this requirement with a score/grade of:

4 or higher on the AP Biology exam.

MATHEMATICS

You may also satisfy this requirement with a score/grade of:

3 or higher on the AP Calculus AB exam satisfies MATH 1A;

3 or 4 on the AP Calculus BC exam satisfies MATH 1A;

5 on the AP Calculus BC exam satisfies MATH 1A + 1B.

LANGUAGE OTHER THAN ENGLISH (LOTE) REQUIREMENT

3 or better on the Foreign Language AP Exam

READING AND COMPOSITION REQUIREMENT

You may also satisfy this requirement with a score/grade of:

4 or 5 on the AP exam in English Language and Composition satisfies ENGLISH R1A;

4 on the AP exam in English Literature and Composition satisfies ENGLISH R1A;

5 on the AP exam in English Literature and Composition satisfies ENGLISH R1A + R1B.

See ADDITIONAL REQUIREMENTS section for additional options to satisfy requirements.

CHEMISTRY

****REFER TO TOP OF AGREEMENT****

CHEM 1A - General Chemistry (3.00)
--- And ---
CHEM 1AL - General Chemistry Laboratory (2.00)



CHEM 1A - General Chemistry (5.00)
--- And ---
CHEM 1B - General Chemistry (5.00)

CHEM 1B - General Chemistry (4.00)



CHEM 1B - General Chemistry (5.00)
--- And ---
CHEM 1C - General Chemistry & Qualitative Analysis (5.00)

CHEM 1A - General Chemistry (3.00)
--- And ---
CHEM 1AL - General Chemistry Laboratory (2.00)
--- And ---
CHEM 1B - General Chemistry (4.00)



Articulates as Course-to-Course Only

ORGANIC CHEMISTRY

****REFER TO TOP OF AGREEMENT****

CHEM 3A - Chemical Structure and Reactivity (3.00)
--- And ---
CHEM 3AL - Organic Chemistry Laboratory (2.00)



CHEM 12A - Organic Chemistry (4.00)
--- And ---
CHEM 12AL - Organic Chemistry Laboratory (2.00)
--- And ---
CHEM 12B - Organic Chemistry (4.00)
--- And ---
CHEM 12BL - Organic Chemistry Laboratory (2.00)

CHEM 3B - Chemical Structure and Reactivity (3.00)
--- And ---
CHEM 3BL - Organic Chemistry Laboratory (2.00)



CHEM 12B - Organic Chemistry (4.00)
--- And ---
CHEM 12BL - Organic Chemistry Laboratory (2.00)
--- And ---
CHEM 12C - Organic Chemistry (4.00)
--- And ---
CHEM 12CL - Organic Chemistry Laboratory (2.00)

CHEM 3A - Chemical Structure and Reactivity (3.00)
--- And ---
CHEM 3AL - Organic Chemistry Laboratory (2.00)
--- And ---
CHEM 3B - Chemical Structure and Reactivity (3.00)
--- And ---
CHEM 3BL - Organic Chemistry Laboratory (2.00)



No Course Articulated

MATHEMATICS

****REFER TO TOP OF AGREEMENT****

MATH 1A - Calculus (4.00)



MATH 1A - Calculus (5.00)
--- Or ---
MATH 1AH - Honors Calculus I (5.00)

MATH 1B - Calculus (4.00)



MATH 1B - Calculus (5.00)
--- And ---
MATH 1C - Calculus (5.00)

MATH 53 - Multivariable Calculus (4.00)



MATH 1C - Calculus (5.00)

--- And ---

MATH 1D - Calculus (5.00)

MATH 54 - Linear Algebra and Differential Equations (4.00)



MATH 2A - Differential Equations (5.00)

--- And ---

MATH 2B - Linear Algebra (5.00)

PHYSICS

****REFER TO TOP OF AGREEMENT****

PHYSICS 7A - Physics for Scientists and Engineers (4.00)



PHYS 4A - General Physics (Calculus) (6.00)

PHYSICS 7B - Physics for Scientists and Engineers (4.00)



PHYS 4B - General Physics (Calculus) (6.00)

--- And ---

PHYS 4C - General Physics (Calculus) (6.00)

PHYSICS 7C - Physics for Scientists and Engineers (4.00)



PHYS 4C - General Physics (Calculus) (6.00)

--- And ---

PHYS 4D - General Physics (Calculus) (6.00)

PHYSICS 7A - Physics for Scientists and Engineers (4.00)

--- And ---

PHYSICS 7B - Physics for Scientists and Engineers (4.00)



Articulates as Course-to-Course Only

PHYSICS 7A - Physics for Scientists and Engineers (4.00)

--- And ---

PHYSICS 7B - Physics for Scientists and Engineers (4.00)

--- And ---

PHYSICS 7C - Physics for Scientists and Engineers (4.00)



Articulates as Course-to-Course Only

--- Or ---

PHYSICS 8A - Introductory Physics (4.00)



PHYS 4A - General Physics (Calculus) (6.00)

--- And ---

PHYS 4B - General Physics (Calculus) (6.00)

--- Or ---

PHYS 2A - General Physics (5.00)

--- And ---

PHYS 2AM - General Physics: Calculus Supplement (1.00)

--- And ---

PHYS 2B - General Physics (5.00)

--- And ---

PHYS 2BM - General Physics: Calculus Supplement (1.00)

PHYSICS 8B - Introductory Physics (4.00)



PHYS 4B - General Physics (Calculus) (6.00)

--- And ---

PHYS 4C - General Physics (Calculus) (6.00)

--- Or ---

PHYS 2B - General Physics (5.00)

--- And ---

PHYS 2BM - General Physics: Calculus Supplement (1.00)

--- And ---

PHYS 2C - General Physics (5.00)

--- And ---

PHYS 2CM - General Physics: Calculus Supplement (1.00)

PHYSICS 8A - Introductory Physics (4.00)

--- And ---

PHYSICS 8B - Introductory Physics (4.00)



Articulates as Course-to-Course Only

BIOLOGY

****REFER TO TOP OF AGREEMENT****

BIOLOGY 1A - General Biology Lecture (Cells, Genetics, Animal Form & Function) (3.00)

--- And ---

BIOLOGY 1AL - General Biology Laboratory (2.00)



BIOL 1A - Principles of Cell Biology (6.00)

--- And ---

BIOL 1B - Form & Function in Plants & Animals (6.00)



Articulates as Course-to-Course Only

BIOLOGY 1A - General Biology Lecture (Cells, Genetics, Animal Form & Function) (3.00)

--- And ---

BIOLOGY 1AL - General Biology Laboratory (2.00)

--- And ---

BIOLOGY 1B - General Biology (Plant Form & Function, Ecology, Evolution) (4.00)

READING AND COMPOSITION (R&C)

****REFER TO TOP OF AGREEMENT****

ENGLISH R1A - Reading and Composition (4.00)



ENGL 1A - Composition & Reading (5.00)

--- And ---

ENGL 1B - Composition, Critical Reading & Thinking Through Literature (5.00)

--- Or ---

ENGL 1AH - Honors Composition & Reading (5.00)

--- And ---

ENGL 1BH - Honors Composition, Critical Reading, & Thinking Through Literature (5.00)

ENGLISH R1B - Reading and Composition (4.00)



ENGL 1B - Composition, Critical Reading & Thinking Through Literature (5.00)

--- And ---

ENGL 1C - ARGUMENTATIVE WRITING & CRITICAL THINKING (5.00)

--- Or ---

ENGL 1BH - Honors Composition, Critical Reading, & Thinking Through Literature (5.00)

--- And ---

ENGL 1CH - HONORS ARGUMENTATIVE WRITING & CRITICAL THINKING (5.00)

LANGUAGE OTHER THAN ENGLISH

****REFER TO TOP OF AGREEMENT****

FL-Foreign Language



JAPN 3 - Elementary Japanese III (5.00)

SPAN 3 - Elementary Spanish III (5.00)

END OF AGREEMENT

Articulation Agreement by Major

Effective during the 2020-2021 Academic Year

To: University of California, Davis
2020-2021 General Catalog, Quarter

From: Foothill College
2020-2021 General Catalog, Quarter

Biochemistry & Molecular Biology B.S.

INFORMATION AND ADVISORIES

Special Advising Note:

Transfer students are strongly advised to complete as many preparatory courses as possible for their major before enrolling at UC Davis. Preparing well for the major helps students move efficiently toward graduation and significantly reduces time to degree.

Transfer students also must meet UC transfer admission requirements. UC Davis requires that students complete the minimum transfer admission requirements by the end of Spring term prior to Fall enrollment. See the [UC Transfer Admission webpage](#). In order to receive priority consideration it is strongly recommended that transfer students complete UC transfer admission requirements in English and Mathematics by the end of Fall term prior to enrollment.

REQUIREMENTS FOR ADMISSION:

The Biochemistry and Molecular Biology major is selective and require preparatory coursework for admission. Any required courses that are offered at your current campus must be completed by the close of Spring term prior to Fall enrollment at UC Davis. If required courses are not offered at your college, you must complete them after enrolling at UC Davis.

Transfer students must earn an overall transfer GPA of 2.80 or higher to be competitive candidates for admission to this major. Candidates must complete courses comparable to the following UC Davis courses with a GPA of at least 2.50 for each of the three course groups. It is recommended that candidates have already achieved the minimum required GPAs for the courses in the groups below that have been completed by the time of application and maintain them through the transfer academic update filing period. Courses must be taken for a letter grade, with no grade less than C. (Advanced Placement (AP) or International Baccalaureate (IB) Higher Level examinations may satisfy UC Davis course equivalents).

- Biological Sciences 2A/B/C (if only one Biological Science course is completed at the time of TAG, you must have a B- or higher)
- Chemistry 2A/B/C
- Mathematics 17A/B/C or 21A/B

It is also recommended that transfer students complete courses comparable to the following UC Davis courses. Completion of these courses will help you move more efficiently toward graduation. Courses should be taken for a letter grade, with no grade less than C:

- Organic Chemistry 118A/B/C
- Physics 7A/B/C

Transfer Admission Guarantee (TAG) Note:

GPA and other requirements to obtain a UC Davis TAG may differ from those stated here for general transfer admission to the major. Visit <http://tag.ucdavis.edu> for details regarding UC Davis TAG.

Intersegmental General Education Transfer Curriculum (IGETC)/UC Davis General Education (GE) Note:

Students have two choices for selection of a GE pattern: IGETC or UC Davis GE. IGETC is available only at California Community Colleges and works well for students planning to complete undergraduate degrees at UC Davis. See additional details about IGETC in ASSIST. UC Davis accepts partial IGETC certification and IGETC for STEM. Students not planning to complete IGETC should see important information about the UC Davis GE pattern. Students not planning to complete IGETC should contact the Dean's Office of your undergraduate college at UC Davis who determines whether you have satisfied the GE requirement. See a UC Davis academic advisor to understand how to complete all of the GE components.

College Foreign Language Requirement Note:

Transfer students pursuing this major who do not certify IGETC must complete a college graduation requirement in a foreign language. See <https://ucdcl.ucdavis.edu/> and check with your UC Davis College Dean's Office or the Biology Academic Success Center for more information.

Advanced Placement (AP) and International Baccalaureate (IB) Examination Note:

AP and IB examination credit policies are detailed in the UC Davis [General Catalog](#). Quick reference charts for AP and IB are also available [here](#).

MAJOR PREPARATION

- Please carefully review Information and Advisories and Course Articulation Details.

COURSE ARTICULATION DETAILS

- It is highly recommended that students complete an entire Physics series at their Community College that is equivalent to the entire UC Davis Physics 7A/B/C series before transferring. Students who transfer without completing an entire series may be required to take additional Physics courses upon arrival at UC Davis and will need to meet with a UC Davis advisor before continuing with Physics.
- **Important note:** Due to the limitations and bugs on the ASSIST platform at this time, it is important to view both the department and major agreements for a complete picture of the articulation arrangements. [Please refer to the appropriate department agreements in conjunction with the major agreement below.](#)
- **Attention:** Articulation agreements are California Community College *specific*. Lower division courses that are taken at multiple California Community Colleges may articulate differently from what is indicated in the department or major agreements. It is recommended that series courses be completed at the same California Community College. Please contact your California Community College advisor for more information.

PREPARATION COURSES FOR THE MAJOR

Highly recommended to complete the entire series

If the entire sequence is not completed prior to transfer, students must consult the department advisor prior to enrollment

BIOLSCI 002A - Introduction to Biology: Essentials of Life on Earth (5.00) ← **BIOL 1A** - Principles of Cell Biology (6.00)

BIOLSCI 002B - Introduction to Biology: Principles of Ecology & Evolution (5.00) ←

BIOL 1B - Form & Function in Plants & Animals (6.00)
--- And ---
BIOL 1C - Evolution, Systematics & Ecology (6.00)

BIOLSCI 002C - Introduction to Biology: Biodiversity & the Tree of Life (5.00) ←

BIOL 1B - Form & Function in Plants & Animals (6.00)
--- And ---
BIOL 1C - Evolution, Systematics & Ecology (6.00)

Select 1 Series from the following

Highly recommended to complete the entire series

If the entire sequence is not completed prior to transfer, students must consult the department advisor prior to enrollment

Select courses in consultation with an advisor

CHEM 002A - General Chemistry (5.00)	←	CHEM 1A - General Chemistry (5.00)
CHEM 002B - General Chemistry (5.00)	←	CHEM 1B - General Chemistry (5.00)
CHEM 002C - General Chemistry (5.00)	←	CHEM 1C - General Chemistry & Qualitative Analysis (5.00)

--- Or ---

CHEM 002AH - Honors General Chemistry (5.00)	←	No Course Articulated
CHEM 002BH - Honors General Chemistry (5.00)	←	No Course Articulated
CHEM 002CH - Honors General Chemistry (5.00)	←	No Course Articulated

--- Or ---

CHEM 003A - Chemistry for Life Sciences: Determining Structure & Predicting Properties (5.00)	←	No Course Articulated
CHEM 003B - Chemistry for Life Sciences: Predicting & Characterizing Chemical Change (5.00)	←	No Course Articulated
CHEM 003C - Chemistry for Life Sciences: Controlling Processes & Synthetic Pathways (5.00)	←	No Course Articulated

Select 1 Series from the following

Highly recommended to complete the entire series

If the entire sequence is not completed prior to transfer, students must consult the department advisor prior to enrollment

Select courses in consultation with an advisor

CHEM 118A - Organic Chemistry for Health & Life Sciences (4.00)	←	CHEM 12A - Organic Chemistry (4.00) <ul style="list-style-type: none"> • <i>Articulation applies to one series only, or one series plus labs</i>
CHEM 118B - Organic Chemistry for Health & Life Sciences (4.00)	←	CHEM 12B - Organic Chemistry (4.00) <ul style="list-style-type: none"> • <i>Articulation applies to one series only, or one series plus labs</i>
CHEM 118C - Organic Chemistry for Health & Life Sciences (4.00)	←	CHEM 12C - Organic Chemistry (4.00) <ul style="list-style-type: none"> • <i>Articulation applies to one series only, or one series plus labs</i>

--- Or ---

CHEM 128A - Organic Chemistry (3.00)	←	CHEM 12A - Organic Chemistry (4.00) <ul style="list-style-type: none"> • <i>Articulation applies to one series only, or one series plus labs</i>
CHEM 128B - Organic Chemistry (3.00)	←	CHEM 12B - Organic Chemistry (4.00) <ul style="list-style-type: none"> • <i>Articulation applies to one series only, or one series plus labs</i>
CHEM 128C - Organic Chemistry (3.00)	←	CHEM 12C - Organic Chemistry (4.00) <ul style="list-style-type: none"> • <i>Articulation applies to one series only, or one series plus labs</i>
CHEM 129A - Organic Chemistry Laboratory (2.00)	←	CHEM 12A - Organic Chemistry (4.00) <ul style="list-style-type: none"> • <i>Articulation applies to one series only, or one series plus labs</i>
CHEM 129B - Organic Chemistry Laboratory (2.00)	←	CHEM 12B - Organic Chemistry (4.00) <ul style="list-style-type: none"> • <i>Articulation applies to one series only, or one series plus labs</i>

Select 1 Series from the following

Highly recommended to complete the entire series

If the entire sequence is not completed prior to transfer, students must consult the department advisor prior to enrollment

Select courses in consultation with an advisor

MATH 017A - Calculus for Biology & Medicine (4.00)	←	No Course Articulated
MATH 017B - Calculus for Biology & Medicine (4.00)	←	No Course Articulated
MATH 017C - Calculus for Biology & Medicine (4.00)	←	No Course Articulated

--- Or ---

MATH 021A - Calculus (4.00)	←	MATH 1A - Calculus (5.00) <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p style="text-align: center;">--- Or ---</p> <p>MATH 1AH - Honors Calculus I (5.00)</p> <p style="text-align: center;">--- And ---</p> <p>MATH 1AHP - Honors Calculus I Seminar (1.00)</p> </div>
MATH 021B - Calculus (4.00)	←	MATH 1B - Calculus (5.00)
MATH 021C - Calculus (4.00) <ul style="list-style-type: none"> • <i>Recommended; Not required for the major</i> 	←	MATH 1C - Calculus (5.00)

Select 1 Series from the following

Highly recommended to complete the entire series

If the entire sequence is not completed prior to transfer, students must consult the department advisor prior to enrollment

Select courses in consultation with an advisor

PHYSICS 007A - General Physics (4.00)	←	<table border="1"> <tr><td>PHYS 2A - General Physics (5.00)</td></tr> <tr><td>--- And ---</td></tr> <tr><td>PHYS 2B - General Physics (5.00)</td></tr> <tr><td>--- And ---</td></tr> <tr><td>PHYS 2C - General Physics (5.00)</td></tr> </table>	PHYS 2A - General Physics (5.00)	--- And ---	PHYS 2B - General Physics (5.00)	--- And ---	PHYS 2C - General Physics (5.00)
PHYS 2A - General Physics (5.00)							
--- And ---							
PHYS 2B - General Physics (5.00)							
--- And ---							
PHYS 2C - General Physics (5.00)							
PHYSICS 007B - General Physics (4.00)	←	<table border="1"> <tr><td>PHYS 2A - General Physics (5.00)</td></tr> <tr><td>--- And ---</td></tr> <tr><td>PHYS 2B - General Physics (5.00)</td></tr> <tr><td>--- And ---</td></tr> <tr><td>PHYS 2C - General Physics (5.00)</td></tr> </table>	PHYS 2A - General Physics (5.00)	--- And ---	PHYS 2B - General Physics (5.00)	--- And ---	PHYS 2C - General Physics (5.00)
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--- And ---							
PHYS 2B - General Physics (5.00)							
--- And ---							
PHYS 2C - General Physics (5.00)							

--- Or ---

PHYSICS 009A - Classical Physics (5.00)	←	PHYS 4A - General Physics (Calculus) (6.00)
PHYSICS 009B - Classical Physics (5.00)	←	PHYS 4C - General Physics (Calculus) (6.00)
PHYSICS 009C - Classical Physics (5.00)	←	PHYS 4B - General Physics (Calculus) (6.00)

END OF AGREEMENT

Articulation Agreement by Major

Effective during the 2020-2021 Academic Year

To: University of California, Santa Cruz
2020-2021 General Catalog, Quarter

From: Foothill College
2020-2021 General Catalog, Quarter

Chemistry, Biochemistry Concentration B.S.

GENERAL INFORMATION FOR ALL MAJORS

All transfer applicants must satisfy University of California admissions eligibility requirements as well as meeting campus selection criteria. All admission requirements must be completed by the end of spring prior to transfer. For more information on UC admissions eligibility requirements and admission to UC Santa Cruz, please visit the Admissions website:

<https://admissions.ucsc.edu/apply/transfer-students/preparing.html>.

This articulation agreement lists course-to-course, sequence-to-sequence or requirement substitutions for preparation in the major. **Transfer students are strongly encouraged to complete as many major preparatory courses as possible prior to enrolling at UCSC. Completion of all major preparatory courses is not an admissions requirement, but some majors require certain courses to be completed prior to transfer with a specified GPA, and completion or near completion of major preparatory courses will help students move more efficiently toward graduation after transfer.**

UC Santa Cruz Advanced Placement (AP) and International Baccalaureate (IB) credit policies are detailed in the link below:

<https://admissions.ucsc.edu/publications/ap-ib-chart.pdf>

CHEMISTRY, BIOCHEMISTRY CONCENTRATION B.S.

Please visit the department's website to learn more about this major: <https://www.chemistry.ucsc.edu>

The biochemistry concentration is designed for students who intend to pursue a career in biochemistry or in a related field such as biotechnology, and it provides an especially rigorous chemistry emphasis.

ADMISSION SELECTION CRITERIA

To be considered for admission to the Chemistry B.S. major, transfer students must pass equivalents of the following courses with a cumulative GPA of 2.50 or higher:

CHEM 1A: General Chemistry

CHEM 1B/M: General Chemistry and General Chemistry Laboratory

CHEM 1C/N: General Chemistry and General Chemistry Laboratory

MATH 22: Introduction to Calculus of Several Variables

Plus one of the following options:

MATH 11A: Calculus with Applications **AND** MATH 11B: Calculus with Applications

OR

MATH 19A: Calculus for Science, Engineering, and Mathematics **AND** MATH 19B: Calculus for Science, Engineering, and Mathematics

In addition to the courses required for transfer admission, the following courses are strongly recommended prior to transfer to ensure timely graduation:

CHEM 8A/8L: Organic Chemistry and Organic Chemistry Laboratory

CHEM 8B/8M: Organic Chemistry and Organic Chemistry Laboratory

PHYS 6A/6L: Introductory Physics I and Introductory Physics I Laboratory

PHYS 6B/6M: Introductory Physics II and Introductory Physics II Laboratory

Prospective students are encouraged to prioritize required and recommended major preparation, and may additionally complete courses that articulate to UC Santa Cruz general education requirements as time allows.

THIS IS A SCREENING MAJOR. For more information on screening major requirements please visit the Admissions website:

<https://admissions.ucsc.edu/apply/transfer-students/major-prep.html>

MAJOR PREPARATION COURSES REQUIRED FOR TRANSFER

CHEM 1A - General Chemistry (5.00)
 --- And ---
CHEM 1B - GENERAL CHEMISTRY (5.00)
 --- And ---
CHEM 1C - GENERAL CHEMISTRY (5.00)
 --- And ---
CHEM 1M - GENERAL CHEMISTRY LABORATORY (2.00)
 --- And ---
CHEM 1N - General Chemistry Laboratory (2.00)



CHEM 1A - General Chemistry (5.00)
 --- And ---
CHEM 1B - General Chemistry (5.00)
 --- And ---
CHEM 1C - General Chemistry & Qualitative Analysis (5.00)

--- Or ---

CHEM 1AH - Honors General Chemistry (5.00)
 --- And ---
CHEM 1BH - Honors General Chemistry (5.00)
 --- And ---
CHEM 1C - General Chemistry & Qualitative Analysis (5.00)

MATH 22 - INTRODUCTION TO CALCULUS OF SEVERAL VARIABLES (5.00) ←

MATH 1C - Calculus (5.00)
 --- And ---
MATH 1D - Calculus (5.00)

Select 1 Sequence(s) from the following

MATH 11A - CALCULUS WITH APPLICATIONS (5.00) ← **MATH 1A** - Calculus (5.00)
 --- And ---

MATH 11B - CALCULUS WITH APPLICATIONS (5.00) ← **MATH 1B** - Calculus (5.00)

--- Or ---

MATH 19A - Calculus for Science, Engineering, and Mathematics (5.00) ←

MATH 1A - Calculus (5.00)
 --- And ---
MATH 1B - Calculus (5.00)

--- And ---

MATH 19B - Calculus for Science, Engineering, and Mathematics (5.00) ←

MATH 1B - Calculus (5.00)
 --- And ---
MATH 1C - Calculus (5.00)

STRONGLY RECOMMENDED ADVANCED PREPARATION COURSES

CHEM 8A - Organic Chemistry (5.00) ←

CHEM 12A - Organic Chemistry (4.00)
 --- And ---
CHEM 12B - Organic Chemistry (4.00)

--- And ---

CHEM 8L - Organic Chemistry Laboratory (2.00) ←

CHEM 12AL - Organic Chemistry Laboratory (2.00)
 --- And ---
CHEM 12BL - Organic Chemistry Laboratory (2.00)

--- Or ---

CHEM 13AH - Honors Organic Chemistry Laboratory (3.00)
 --- And ---
CHEM 13BH - Honors Organic Chemistry Laboratory (3.00)

CHEM 8B - Organic Chemistry (5.00)	←	CHEM 12B - Organic Chemistry (4.00) --- And --- CHEM 12C - Organic Chemistry (4.00)
--- And ---		
CHEM 8M - Organic Chemistry Laboratory (2.00)	←	CHEM 12BL - Organic Chemistry Laboratory (2.00) --- And --- CHEM 12CL - Organic Chemistry Laboratory (2.00) --- Or --- CHEM 13BH - Honors Organic Chemistry Laboratory (3.00) --- And --- CHEM 13CH - Honors Organic Chemistry Laboratory (3.00)

PHYS 6A - Introductory Physics I (5.00)	←	PHYS 4A - General Physics (Calculus) (6.00) --- Or --- PHYS 2A - General Physics (5.00) --- And --- PHYS 2AM - General Physics: Calculus Supplement (1.00)
--- And ---		
PHYS 6L - Introductory Physics I Laboratory (1.00)	←	PHYS 4A - General Physics (Calculus) (6.00) --- Or --- PHYS 2A - General Physics (5.00) --- And --- PHYS 2AM - General Physics: Calculus Supplement (1.00)

PHYS 6B - INTRODUCTORY PHYSICS II (5.00)	←	PHYS 4C - General Physics (Calculus) (6.00) --- Or --- PHYS 2B - General Physics (5.00) --- And --- PHYS 2BM - General Physics: Calculus Supplement (1.00) --- And --- PHYS 2C - General Physics (5.00) --- And --- PHYS 2CM - General Physics: Calculus Supplement (1.00)
--- And ---		
PHYS 6M - INTRODUCTORY PHYSICS II LABORATORY (1.00)	←	PHYS 4C - General Physics (Calculus) (6.00) --- Or --- PHYS 2B - General Physics (5.00) --- And --- PHYS 2BM - General Physics: Calculus Supplement (1.00) --- And --- PHYS 2C - General Physics (5.00) --- And --- PHYS 2CM - General Physics: Calculus Supplement (1.00)

ADDITIONAL MAJOR PREPARATION COURSES

BIOL 20A - CELL AND MOLECULAR BIOLOGY (5.00)	←	BIOL 1A - Principles of Cell Biology (6.00)
---	---	--

BIOE 20B - Development and Physiology (5.00)

← **BIOL 1B** - Form & Function in Plants & Animals (6.00)

PHYS 6C - INTRODUCTORY PHYSICS III (5.00)

← **PHYS 4B** - General Physics (Calculus) (6.00)

--- Or ---

PHYS 2B - General Physics (5.00)

--- And ---

PHYS 2BM - General Physics: Calculus Supplement (1.00)

--- And ---

PHYS 6N - INTRODUCTORY PHYSICS III LABORATORY (1.00)

← **PHYS 4B** - General Physics (Calculus) (6.00)

--- Or ---

PHYS 2B - General Physics (5.00)

--- And ---

PHYS 2BM - General Physics: Calculus Supplement (1.00)

Select 1 Course(s) from the following

AM 10 - Mathematical Methods for Engineers I (5.00)

← **MATH 2B** - Linear Algebra (5.00)

--- Or ---

MATH 21 - LINEAR ALGEBRA (5.00)

← **MATH 2B** - Linear Algebra (5.00)

--- Or ---

MATH 24 - ORDINARY DIFFERENTIAL EQUATIONS (5.00)

← **MATH 2A** - Differential Equations (5.00)

END OF AGREEMENT

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE
Temporary Program Creation Process
Feedback Form for New Programs

Until the new permanent program creation process has been determined, as part of the temporary program creation process this form shall be used by a department to gather feedback on a new program from key governance committees on campus. A complete program narrative and supporting documentation must be submitted to the groups listed below (simultaneous submission is recommended). Each committee will provide initial feedback via email within two weeks but might also provide additional feedback after their monthly meetings.

After a two-week period, regardless of whether feedback has been received from the three committees, the Division Curriculum Committee may consider the new program for approval. Following Division CC approval, please forward this completed form to the Office of Instruction.

Faculty Author(s): Ron Painter
Division: STEM

Program Title: Biochemistry (AS)
Program Units: 60-62

Workforce/CTE Program (Y/N): N
Please note that Workforce/CTE status is dependent on the TOP Code assigned to the program.

Type of Award:
 Non-transcriptable credit certificate AA/AS Degree (local)
 Certificate of Achievement AA-T/AS-T Degree (ADT)
 Noncredit certificate

EQUITY & EDUCATION https://foothill.edu/gov/equity-and-education/
Date of meeting:
Comments: Submitted to Equity & Education committee on April 27, 2021. No feedback given.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

REVENUE & RESOURCES https://foothill.edu/gov/revenue-and-resources/
Date of meeting: through email – 4/28–5/5 response time
Comments: No questions or comments

ADVISORY COUNCIL https://foothill.edu/gov/council/
Date of meeting:
Comments: Submitted to Advisory Council on April 27, 2021. No feedback given.

Division Curriculum Committee Approval Date: 4/27/21

Division CC Representative: Zach Cembellin

**Foothill College
Credit Program Narrative
Certificate of Achievement in Data Analytics**

Item 1. Program Goals and Objectives

The goal of the Certificate of Achievement in Data Analytics is to offer practical training in the most essential skills and tools used by businesses and organizations to analyze data to find actionable insights, and drive data-based decisions to increase business success. The demand for data professionals—who are fluent in the latest data analytics techniques and methods combined with the business acumen needed to apply their skills strategically in today’s business environment—has never been greater and promises to be a rich source of career opportunity for the foreseeable future. With a strong focus on students from diverse populations, this certificate will provide individuals with an opportunity to benefit from the strong growth in data analytics job positions that require the skills offered by this certificate.

Program Learning Outcomes:

- Upon completion of the program, the student will have acquired the necessary basic skills to conduct data analytics projects in a typical business environment.
- Upon completion of the program, the student will be able to demonstrate appropriate critical thinking, problem-solving skills and communication skills to contribute to effective data analytics in a business organization.

Item 2. Catalog Description

Created in collaboration with Silicon Valley Bank and Tableau, the Certificate of Achievement in Data Analytics is designed for people who are seeking to gain real-world experience in data analytics in pursuit of a career as a data professional. The program provides 23 units of instruction and hands-on practice in understanding data needs of a business; acquiring, cleaning, storing, sorting, visualizing, analyzing, and presenting data; and positively impacting business outcomes through data analytics.

Item 3. Program Requirements

Requirements	Course #	Name	Units	Sequence
Core Courses (23 units)	BUSI 11	Introduction to Information Systems	5	Fall, Year 1
	BUSI 12	Introduction to Data Analytics & Business Decisions	4	Winter, Year 1
	C S 31A	Introduction to Database Management Systems	4.5	Spring, Year 1
	C S 48A	Data Visualization	4.5	Spring, Year 1
	MATH 10	Elementary Statistics	5	Fall, Year 2

TOTAL UNITS: 23 units

Proposed Sequence:

Year 1, Fall = 5 units

Year 1, Winter = 4 units

Year 1, Spring = 9 units

Year 2, Fall = 5 units

TOTAL UNITS: 23 units**Item 4. Master Planning**

Foothill College offers programs and services that empower students to achieve their goals as members of the workforce, as future students, and as global citizens. There is currently a high demand for qualified individuals who understand data analytics and can utilize them to benefit an organization.

This innovative program will allow students to achieve their goals, whether it is to promote their business, advance in place of employment or transfer credit to a four-year college. The Certificate of Achievement in Data Analytics is also a pivotal step for students who are retraining, returning to workplace and/or updating marketing skills.

Item 5. Enrollment and Completer Projections

On average, BUSI 11, C S 31A, and MATH 10 have been offered consistently for the past 4 years (2016-2020), with consistent enrollment in all classes over the same period of time. While BUSI 12 and C S 48A have only been offered starting Winter 2020, initial student interest is extremely high for both of these courses. Due to high demand for data analytics skills in the marketplace, as well as the highly visible partnership with Tableau and Silicon Valley Bank, we are confident that enrollment will grow for all courses in the certificate. Also, the relatively compact nature of the certificate will be extremely attractive to individuals who wish to employ the newly acquired skills in their current roles. Further, because all of the courses can be taught completely online, if needed, it is anticipated that international participation over the next five years will significantly increase the number of students who complete this certificate.

		2017-18		2018-19		2019-20	
Course #	Course Title	Annual Sections	Annual Enrollment	Annual Sections	Annual Enrollment	Annual Sections	Annual Enrollment
BUSI 11	Intro to Info Systems	9	357	8	349	7	302
BUSI 12	Intro to Data Analytics & Business Decisions	NA	NA	NA	NA	2	62
CS 31A	Intro to Database Management Systems	3	94	3	89	3	106
CS 48A	Data Visualization	NA	NA	NA	NA	1	38
MATH 10	Introduction to Information Systems	36	1861	54	2201	60	2178

Item 6. Place of Program in Curriculum/Similar Programs

Foothill College currently offers all courses necessary to complete the Certificate of Achievement in Data Analytics. Students will be able to complete the coursework as early as Spring 2021. The new transcriptable certificate will be available to students as soon as it is approved.

Item 7. Similar Programs at Other Colleges in Service Area

There is one community college in the Bay Region issuing two awards on average annually (last three years, ending 2018-19) on TOP 0509.70 - E-Commerce (business emphasis). In the Silicon Valley Sub-Region, there are no community colleges that issued awards on average annually (last three years) in this TOP code.

The Foothill collaboration with Tableau and Silicon Valley Bank provides significant differentiation for our Data Analytics certificate from any competitor. Additionally, the Foothill certificate focuses on practical application data analytics skills.

Additional Information Required for State Submission:

TOP Code: 0509.70 - E-Commerce (business emphasis): Programs that combine marketing and management principles with technical applications of the Internet and World Wide Web, with main emphasis on business principles.

Annual Completers: 40

Net Annual Labor Demand: 10,290 (Bay Region)

Faculty Workload: .6 annual load or 60% of one FTEF

New Faculty Positions: None, our existing full-time and adjunct faculty will teach the courses

New Equipment: \$0

New/Remodeled Facilities: \$0

Library Acquisitions: \$0

Gainful Employment: Yes

Program Review Date: December 2021

Distance Education: 50-99%



Data Analytics Occupations Labor Market Information Report Foothill College

Prepared by the San Francisco Bay Center of Excellence for Labor Market Research
May 2021

Recommendation

Based on all available data, there appears to be an “undersupply” of Data Analytics workers compared to the demand for this cluster of occupations in the Bay region and in the Silicon Valley sub-region (Santa Clara county). There is a projected annual gap of about 306 students in the Bay region and 93 students in the Silicon Valley Sub-Region.

Introduction

This report provides student outcomes data on employment and earnings for TOP 0509.70 - E-Commerce (business emphasis) programs in the state and region. It is recommended that these data be reviewed to better understand how outcomes for students taking courses on this TOP code compare to potentially similar programs at colleges in the state and region, as well as to outcomes across all CTE programs at Foothill College and in the region.

This report profiles Data Analytics Occupations in the 12 county Bay region and in the Silicon Valley sub-region for a proposed new program at Foothill College.

- Operations Research Analysts (15-2031):** Formulate and apply mathematical modeling and other optimizing methods to develop and interpret information that assists management with decision making, policy formulation, or other managerial functions. May collect and analyze data and develop decision support software, service, or products. May develop and supply optimal time, cost, or logistics networks for program evaluation, review, or implementation.
 - Entry-Level Educational Requirement: Bachelor’s degree
 - Training Requirement: None
 - Percentage of Community College Award Holders or Some Postsecondary Coursework: 21%

Occupational Demand

Table 1. Employment Outlook for Data Analytics Occupations in Bay Region

Occupation	2019 Jobs	2024 Jobs	5-yr Change	5-yr % Change	5-yr Total Openings	Annual Openings	25% Hourly Earning	Median Hourly Wage
Operations Research Analysts	3,421	3,702	280	8%	1,847	308	\$ 39	\$ 54
Total	3,421	3,702	281	8%	1,847	308	\$39	\$54

Source: EMSI 2021.2

Bay Region includes: Alameda, Contra Costa, Marin, Monterey, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano and Sonoma Counties

Table 2. Employment Outlook for Data Analytics Occupations in Silicon Valley Sub-region

Occupation	2019 Jobs	2024 Jobs	5-yr Change	5-yr % Change	5-yr Total Openings	Annual Openings	25% Hourly Earning	Median Hourly Wage
Operations Research Analysts	969	1,130	161	17%	556	93	\$ 39	\$ 57
Total	969	1,130	161	17%	556	93	\$39	\$57

Source: EMSI 2021.2

Silicon Valley Sub-Region includes: Santa Clara County

Job Postings in Bay Region and Silicon Valley Sub-Region**Table 3. Number of Job Postings by Occupation for latest 12 months (May 2020 - Apr 2021)**

Occupation	Bay Region	Silicon Valley
Operations Research Analysts	10,290	2,777

Source: Burning Glass

Table 4a. Top Job Titles for Data Analytics Occupations for latest 12 months (May 2020 - Apr 2021) Bay Region

Title	Bay	Title	Bay
Research Assistant	174	Scientist II	65
Research Associate	159	Researcher	56
Operations Analyst	129	Operations Analyst III	46
Business Operations Analyst	123	Research Analyst	44
Business Development Director	102	Scientist I	41
Director, Business Development	83	Research Associate I	40
Research Scientist	73	Process Scientist III	37
Research Associate II	69	Research And Development Technician	35
Researcher III	68	Operations Analyst II	35

Source: Burning Glass

Table 4b. Top Job Titles for Data Analytics Occupations for latest 12 months (May 2020 - Apr 2021) Silicon Valley Sub-Region

Title	Silicon Valley	Title	Silicon Valley
Research Assistant	58	Researcher II	26
Business Operations Analyst	54	Director, Business Development	23
Operations Analyst	40	Research Associate	22
Researcher III	36	Applied Scientist	21
Operations Analyst III	34	Research And Development Technician	16
Operations Analyst II	34	Scientist II	12
Research Scientist	32	Senior Scientist	11
Researcher	31	Senior Operations Analyst	11
Business Development Director	29	Senior Applied Scientist	11

Source: Burning Glass

Industry Concentration

Table 5. Industries hiring Data Analytics Workers in Bay Region

Industry – 6 Digit NAICS (No. American Industry Classification) Codes	Jobs in Industry (2019)	Jobs in Industry (2024)	% Change (2019-24)	% Occupation Group in Industry (2019)
Custom Computer Programming Services	337	372	10%	9%
Corporate, Subsidiary, and Regional Managing Offices	270	236	-13%	7%
Internet Publishing and Broadcasting and Web Search Portals	235	270	15%	7%
Computer Systems Design Services	190	193	2%	5%
Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology)	123	176	44%	5%
Electronic Computer Manufacturing	41	165	298%	5%
Data Processing, Hosting, and Related Services	111	157	41%	4%
Software Publishers	115	144	25%	3%
Administrative Management and General Management Consulting Services	109	123	12%	3%
Research and Development in Biotechnology (except Nanobiotechnology)	76	125	64%	3%

Source: EMSI 2021.2

Table 6. Top Employers Posting Data Analytics Occupations in Bay Region and Silicon Valley Sub-Region (May 2020 - Apr 2021)

Employer	Bay	Employer	Silicon Valley
Facebook	329	Stanford University	146
University Of California	305	Apple Inc.	87
Genentech	273	Amazon	82
Thermo Fisher Scientific Inc	160	Danaher Corporation	63
Stanford University	158	Nvidia Corporation	40
Amazon	140	IBM	34
Day & Zimmermann Incorporated	128	Google Inc.	33
Danaher Corporation	88	Paypal	31
Apple Inc.	87	Cisco Systems Incorporated	29
Lawrence Berkeley National Laboratory	79	Samsung America, Inc.	28

Source: Burning Glass

Educational Supply

There is one (1) community college in the Bay Region issuing 2 awards on average annually (last 3 years ending 2018-19) on TOP 0509.70 - E-Commerce (business emphasis). In the Silicon Valley Sub-Region, there are no community colleges that issued awards on average annually (last 3 years) on this TOP code.

Table 7. Community College Awards on TOP 0509.70 - E-Commerce (business emphasis) in Bay Region

College	Subregion	Certificate Low	Total
Santa Rosa	North Bay	2	2
Total		2	2

Source: Data Mart

Note: The annual average for awards is 2016-17 to 2018-19.

Gap Analysis

Based on the data included in this report, there is a labor market gap in the Bay region with 308 annual openings for the Data Analytics occupational cluster and 2 annual (3-year average) awards for an annual undersupply of 306 students. In the Silicon Valley Sub-Region, there is also a gap with 93 annual openings and no annual (3-year average) awards for an annual undersupply of 93 students.

Student Outcomes

Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0509.70 - E-Commerce (business emphasis)

Metric Outcomes	Bay All CTE Program	Foothill All CTE Program	State 0509.70	Bay 0509.70	Silicon Valley 0509.70	Foothill 0509.70
Students with a Job Closely Related to Their Field of Study	75%	88%	55%	N/A	N/A	N/A
Median Annual Earnings for SWP Exiting Students	\$44,575	\$63,206	\$31,043	\$34,283	N/A	N/A
Median Change in Earnings for SWP Exiting Students	31%	63%	56%	41%	N/A	N/A
Exiting Students Who Attained the Living Wage	52%	67%	51%	N/A	N/A	N/A

Source: Launchboard Strong Workforce Program from version 2017-18.

Skills, Certifications and Education

Table 9. Top Skills for Data Analytics Occupations in Bay Region (May 2020 - Apr 2021)

Skill	Posting	Skill	Posting
Experiments	2,064	Chemistry	709
Data Analysis	1,701	Customer Service	680
Python	1,340	Scheduling	640
Molecular Biology	1,219	Data Science	632
Biology	1,216	Immunology	625
Project Management	1,215	Cancer knowledge	578
Biochemistry	1,147	Quality Assurance and Control	564
Business Development	1,100	Salesforce	547
Product Development	943	Cell Culturing	533
Machine Learning	933	Assay Development	532
Biotechnology	889	Business Operations	531
SQL	849	Cell Biology	531
Operations Analysis	844	Experimental Design	507
Budgeting	736	C++	504

Source: Burning Glass

Table 10. Certifications for Data Analytics Occupations in Bay Region (May 2020 - Apr 2021)

Certification	Posting	Certification	Posting
Driver's License	152	Certified Scrum Professional (CSP)	11
Security Clearance	71	Hazwoper	10
Project Management Certification	71	Clinical Laboratory Scientist (CIS)	9
Certified Animal Laboratory Technician	60	Certified Meeting Planner	9
Project Management Professional (PMP)	18	Laboratory Animal Technologist (LATG)	8

Certification	Posting	Certification	Posting
Series 7	16	Certified Protection Professional (CPP)	8
IT Infrastructure Library (ITIL) Certification	16	Certified Payroll Professional (CPP)	8
Certified Institutional Review Board (IRB) Professional	15	Series 63	7
Certified Information Systems Security Professional (CISSP)	12	SANS/GIAC Certification	7
Six Sigma Certification	11	Phlebotomy Certification	7

Source: Burning Glass

Note: 94% of records have been excluded because they do not include a certification. As a result, the chart below may not be representative of the full sample.

Table 11. Education Requirements for Data Analytics Occupations in Bay Region

Education (minimum advertised)	Latest 12 Mos. Postings	Percent 12 Mos. Postings
Associate's degree	262	3%
Bachelor's degree	5,539	67%
Master's degree	984	12%
Doctoral degree	1,497	18%

Source: Burning Glass

Methodology

Occupations for this report were identified by use of skills listed in O*Net descriptions and job descriptions in Burning Glass. Labor demand data is sourced from Economic Modeling Specialists International (EMSI) occupation data and Burning Glass job postings data. Educational supply and student outcomes data is retrieved from multiple sources, including CTE Launchboard and CCCCCO Data Mart.

Sources

O*Net Online

Labor Insight/Jobs (Burning Glass)

Economic Modeling Specialists International (EMSI)

CTE LaunchBoard www.calpassplus.org/Launchboard/

Statewide CTE Outcomes Survey

Employment Development Department Unemployment Insurance Dataset

Living Insight Center for Community Economic Development

Chancellor's Office MIS system

Contacts

For more information, please contact:

• Leila Jamoosian, Research Analyst, for Bay Area Community College Consortium (BACCC) and Centers of Excellence (CoE), leila@baccc.net

• John Carrese, Director, San Francisco Bay Center of Excellence for Labor Market Research, jcarrese@ccsf.edu or (415) 267-6544

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FOOTHILL COLLEGE
Temporary Program Creation Process
Feedback Form for New Programs

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After a two-week period, regardless of whether feedback has been received from the three committees, the Division Curriculum Committee may consider the new program for approval. Following Division CC approval, please forward this completed form to the Office of Instruction.

Faculty Author(s): Laurence Lew
Division: BSS

Program Title: Data Analytics
Program Units: 23 Units

Workforce/CTE Program (Y/N): Y
Please note that Workforce/CTE status is dependent on the TOP Code assigned to the program.

Type of Award:
 Non-transcriptable credit certificate AA/AS Degree (local)
 Certificate of Achievement AA-T/AS-T Degree (ADT)
 Noncredit certificate

EQUITY & EDUCATION https://foothill.edu/gov/equity-and-education/
Date of meeting: April 12, 2021
Comments: None

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REVENUE & RESOURCES https://foothill.edu/gov/revenue-and-resources/
Date of meeting: April 12, 2021 Comments: None

ADVISORY COUNCIL https://foothill.edu/gov/council/
Date of meeting: April 12, 2021 Comments: None

Division Curriculum Committee Approval Date: April 26, 2021

Division CC Representative: Kas Pereira, Laurence Lew

**Foothill College
Credit Program Narrative
Certificate of Achievement in Network Computing**

Item 1. Program Goals and Objectives

The goal of the Certificate of Achievement in Network Computing is to provide students with industry standard skills for networking in the cloud environment. Students learn a range of topics that cover the technical principals of hardware and software devices required to run applications in the cloud. These principles include the networking requirements to support storage, database management, and software systems, while maintaining secure access.

Program Learning Outcome:

- Upon completion of the program, students will be able to host a database and run queries using an interface from a commercial provider and run a file-server service using a provider of their choice.

Item 2. Catalog Description

The Certificate of Achievement in Network Computing is designed for people who are seeking employment with companies that use computer networks. The program provides 13.5 units of instruction on industry standard skills to understand and deploy networks. Students learn a range of topics that cover the technical principals of the hardware and configuration to run networks while maintaining secure access.

Item 3. Program Requirements

Requirements	Course #	Title	Units	Sequence
Core Courses (13.5 units)	C S 50A	NETWORK BASICS (CCNA)	4.5	Year 1, Fall
	C S 50B	ROUTING & SWITCHING ESSENTIALS (CCNA)	4.5	Year 1, Winter
	C S 50C	SCALING LOCAL AREA NETWORKS (CCNA)	4.5	Year 1, Spring

TOTAL UNITS: 13.5 units

Proposed Sequence:

Year 1, Fall = 4.5 units

Year 1, Winter = 4.5 units

Year 1, Spring = 4.5 units

TOTAL UNITS: 13.5 units

Item 4. Master Planning

Foothill College offers programs and services that empower students to achieve goals as members of the workforce. There is currently a high demand for qualified individuals who are well-versed in networking, which delivers connectivity to organizations of all sizes. It is one of

the required disciplines in technology today. This certificate program will allow companies to hire individuals who are familiar with networking, switches, routers, routing, network security principles and network management.

Item 5. Enrollment and Completer Projections

Currently, there is a significant undersupply of networking workers compared to the demand in the Bay Area region. The median hourly wage for jobs in networking is slightly under \$60/hr. Due to the high demand and relatively high wages for cloud computing jobs, we foresee that the demand for the certificate will be at least 20 students per year. In addition, we expect to offer the courses as hybrid/online split format, which will attract a number of students statewide.

Course #	Course Title	Year 1: 2018-19		Year 2: 2019-20	
		Annual Sections	Annual Enrollment	Annual Sections	Annual Enrollment
C S 50A	NETWORK BASICS (CCNA)	6	107	3	81
C S 50B	ROUTING & SWITCHING ESSENTIALS (CCNA)	2	26	2	22
C S 50C*	SCALING LOCAL AREA NETWORKS (CCNA)	Not yet offered		Not yet offered	

*C S 50C is newly offered, so historical enrollment data is not applicable.

Item 6. Place of Program in Curriculum/Similar Programs

Foothill College offers many different computer science courses, some of which are language-based, while others are in the enterprise networking arena. However, there is no other program similar to the Certificate of Achievement in Network Computing at Foothill.

Item 7. Similar Programs at Other Colleges in Service Area

Currently, the other community colleges offering this certificate in our area are Ohlone College and Cabrillo College. The proposed program is based off the highly successful Cisco Networking Academy program.

Additional Information Required for State Submission:

TOP Code: 0701.00 - Information Technology, General

Annual Completers: 20 plus

Net Annual Labor Demand: Bay Area: 3764; Silicon Valley: 1521

Faculty Workload: 1

New Faculty Positions: 0 (courses will be taught from current FT/PT faculty)

New Equipment: \$0

New/Remodeled Facilities: \$0

Library Acquisitions: \$0

Gainful Employment: Yes

Program Review Date: December, 2025, or earlier as required by the state.

Distance Education: 50 – 99%



IT Essentials Occupations Labor Market Information Report Foothill College

**Prepared by the San Francisco Bay Center of Excellence for Labor Market Research
May 2021**

Recommendation

Based on all available data, there appears to be an “undersupply” of IT Essentials workers compared to the demand for this cluster of occupations in the Bay region and in the Silicon Valley sub-region (Santa Clara county). There is a projected annual gap of about 3,764 students in the Bay region and 1,521 students in the Silicon Valley Sub-Region.

Introduction

This report provides student outcomes data on employment and earnings for TOP 0701.00 - Information Technology, General programs in the state and region. It is recommended that these data be reviewed to better understand how outcomes for students taking courses on this TOP code compare to potentially similar programs at colleges in the state and region, as well as to outcomes across all CTE programs at Foothill College and in the region.

This report profiles IT Essentials Occupations in the 12 county Bay region and in the Silicon Valley sub-region for a proposed new program at Foothill College.

- **Computer User Support Specialists (15-1232):** Provide technical assistance to computer users. Answer questions or resolve computer problems for clients in person, or via telephone or electronically. May provide assistance concerning the use of computer hardware and software, including printing, installation, word processing, electronic mail, and operating systems. Excludes “Network and Computer Systems Administrators” (15-1142).
 Entry-Level Educational Requirement: Some college, no degree
 Training Requirement: None
 Percentage of Community College Award Holders or Some Postsecondary Coursework: 41%

Occupational Demand

Table 1. Employment Outlook for IT Essentials Occupations in Bay Region

Occupation	2019 Jobs	2024 Jobs	5-yr Change	5-yr % Change	5-yr Total Openings	Annual Openings	25% Hourly Earning	Median Hourly Wage
Computer User Support Specialists	33,519	38,062	4,543	14%	19,013	3,803	\$ 26.57	\$ 35.07
Total	33,519	38,062	4,543	14%	19,013	3,803	\$26.57	\$35.07

Source: EMSI 2020.4

Bay Region includes: Alameda, Contra Costa, Marin, Monterey, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano and Sonoma Counties

Table 2. Employment Outlook for IT Essentials Occupations in Silicon Valley Sub-region

Occupation	2019 Jobs	2024 Jobs	5-yr Change	5-yr % Change	5-yr Total Openings	Annual Openings	25% Hourly Earning	Median Hourly Wage
Computer User Support Specialists	13,355	15,200	1,845	14%	7,606	1,521	\$ 25.54	\$ 36.25
Total	13,355	15,200	1,845	14%	7,606	1,521	\$25.54	\$36.25

Source: EMSI 2020.4

Silicon Valley Sub-Region includes: Santa Clara County

Job Postings in Bay Region and Silicon Valley Sub-Region**Table 3. Number of Job Postings by Occupation for latest 12 months (Feb 2020 - Jan 2021)**

Occupation	Bay Region	Silicon Valley
Computer User Support Specialists	10,500	3,642

Source: Burning Glass

Table 4a. Top Job Titles for IT Essentials Occupations for latest 12 months (Feb 2020 - Jan 2021) Bay Region

Title	Bay	Title	Bay
Technical Support Engineer	238	Help Desk Technician	84
Desktop Support	225	IT Specialist	79
Desktop Support Technician	200	IT Support Technician	77
IT Support Specialist	179	Desktop Support Specialist	75
Technical Support Specialist	146	IT Help Desk Technician	54
Field Service Technician	106	Technician Lead	53
Amazon Team Member Hire	98	Desktop Support Engineer	51
IT Technician	87	Support Analyst	47
Team Member Hire	85	Computer Technician	46

Source: Burning Glass

Table 4b. Top Job Titles for IT Essentials Occupations for latest 12 months (Feb 2020 - Jan 2021)**Silicon Valley Sub-Region**

Title	Silicon Valley	Title	Silicon Valley
Technical Support Engineer	131	Support Analyst	24
Desktop Support	88	Hardware Technician	24
IT Support Specialist	52	Desktop Support Specialist	24
Desktop Support Technician	44	Customer Support Engineer	24
Field Service Technician	37	Support Technician	22
IT Technician	36	Service Desk Technician	22
Help Desk Technician	36	IT Specialist	22
Technical Support Specialist	27	Computer Technician	22

Source: Burning Glass

Industry Concentration**Table 5. Industries hiring IT Essentials Workers in Bay Region**

Industry – 6 Digit NAICS (No. American Industry Classification) Codes	Jobs in Industry (2019)	Jobs in Industry (2024)	% Change (2019-24)	% Occupation Group in Industry (2019)
Custom Computer Programming Services	6,702	8,267	23%	21%

Industry – 6 Digit NAICS (No. American Industry Classification) Codes	Jobs in Industry (2019)	Jobs in Industry (2024)	% Change (2019-24)	% Occupation Group in Industry (2019)
Computer Systems Design Services	3,834	4,476	17%	12%
Software Publishers	3,213	4,132	29%	10%
Internet Publishing and Broadcasting and Web Search Portals	2,026	2,462	22%	6%
Electronic Computer Manufacturing	1,795	2,005	12%	6%
Data Processing, Hosting, and Related Services	1,488	1,906	28%	5%
Other Computer Related Services	962	1,270	32%	3%
Corporate, Subsidiary, and Regional Managing Offices	819	763	-7%	2%
Colleges, Universities, and Professional Schools (State Government)	640	661	3%	2%
Colleges, Universities, and Professional Schools	637	671	5%	2%

Source: EMSI 2020.4

Table 6. Top Employers Posting IT Essentials Occupations in Bay Region and Silicon Valley Sub-Region (Feb 2020 - Jan 2021)

Employer	Bay	Employer	Silicon Valley
Amazon	252	Amazon	46
Best Buy	135	IBM	43
IBM	46	Palo Alto Networks	40
Palo Alto Networks	40	Best Buy	35
Excell	37	Cloudious Llc	24
Wells Fargo	35	Matchpoint Solutions Incorporated	23
Thermo Fisher Scientific Inc	35	Vmware Incorporated	22
Facebook	35	Excell	19
Matchpoint Solutions Incorporated	31	Wipro	15
Infobahn Softworld Incorporated	31	KLA-Tencor	15
Svk Technology Solutions	30	Infobahn Softworld Incorporated	15
Cloudious Llc	29	Trinamix	14
Sunpower Corporation	27	Nsys Design Systems	14
Milestone Technologies	27	Microsoft Corporation	14

Source: Burning Glass

Educational Supply

There are six (6) community colleges in the Bay Region issuing 39 awards on average annually (last 3 years ending 2018-19) on TOP 0701.00 - Information Technology, General. In the Silicon Valley Sub-Region, there are no community colleges that issued awards on average annually (last 3 years) on this TOP code.

Table 7. Community College Awards on TOP 0701.00 - Information Technology, General in Bay Region

College	Subregion	Associate	Certificate Low	Total
Diablo Valley	East Bay	1	1	2
Los Medanos	East Bay	0	8	8
Monterey	SC-Monterey	4	0	4
Ohlone	East Bay	1	2	3

College	Subregion	Associate	Certificate Low	Total
San Francisco	Mid-Peninsula	0	12	12
Santa Rosa	North Bay	0	10	10
Total		6	33	39

Source: Data Mart

Note: The annual average for awards is 2016-17 to 2018-19.

Gap Analysis

Based on the data included in this report, there is a large labor market gap in the Bay region with 3,803 annual openings for the IT Essentials occupational cluster and 39 annual (3-year average) awards for an annual undersupply of 3,764 students. In the Silicon Valley Sub-Region, there is also a gap with 1,521 annual openings and no annual (3-year average) awards for an annual undersupply of 1,521 students.

Student Outcomes

Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0701.00 - Information Technology, General

Metric Outcomes	Bay All CTE Program	Foothill All CTE Program	State 0701.00	Bay 0701.00	Silicon Valley 0701.00	Foothill 0701.00
Students with a Job Closely Related to Their Field of Study*	75%	88%	62%	56%	57%	N/A
Median Annual Earnings for SWP Exiting Students	\$45,864	\$67,768	\$30,192	\$36,328	\$40,530	N/A
Median Change in Earnings for SWP Exiting Students	31%	46%	34%	34%	38%	N/A
Exiting Students Who Attained the Living Wage	53%	72%	51%	41%	44%	N/A

Source: Launchboard Strong Workforce Program (Version 2018-19). *Data from Version 2017-18

Skills, Certifications and Education

Table 9. Top Skills for IT Essentials Occupations in Bay Region (Feb 2020 - Jan 2021)

Skill	Posting	Skill	Posting
Technical Support	4,301	SAP	810
Customer Service	2,932	SQL	808
Repair	1,894	Software Installation	764
Printers	1,406	Project Management	748
It Support	1,359	Hardware and Software Configuration	742
Help Desk Support	1,357	Computer Installation and Setup	726
Microsoft Active Directory	1,324	Network Troubleshooting	718
Hardware and Software Installation	1,252	Scheduling	640
Microsoft Operating Systems	1,015	Python	638
Customer Contact	983	Virtual Private Networking (VPN)	638
Linux	938	Transmission Control Protocol / Internet Protocol (TCP / IP)	632
Hardware Troubleshooting	925	Oracle	589
MacIntosh OS	901	Information Systems	576
Troubleshooting Technical Issues	870	Hardware Experience	575

Skill	Posting	Skill	Posting
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Source: Burning Glass

Table 10. Certifications for IT Essentials Occupations in Bay Region (Feb 2020 - Jan 2021)

Certification	Posting	Certification	Posting
Driver's License	793	CompTIA Security+	96
Certified A+ Technician	604	Certified Information Systems Security Professional (CISSP)	52
IT Infrastructure Library (ITIL) Certification	476	Cisco Certified Network Professional (CCNP)	44
CompTIA Network+	263	Certified Information Systems Auditor (CISA)	42
Microsoft Certified Professional (MCP)	229	Microsoft Certified Desktop Support Technician (Legacy)	40
Cisco Certified Network Associate (CCNA)	211	ITIL Foundation	35
Security Clearance	174	Environmental Protection Agency Certification	26
Microsoft Certified Solutions Expert (MCSE)	146	Microsoft Technology Associate (MTA)	25
Microsoft Certified Solutions Associate (MCSA)	145	Certified Information Security Manager (CISM)	25
Project Management Certification	115	Project Management Professional (PMP)	24

Source: Burning Glass

Note: 76% of records have been excluded because they do not include a certification. As a result, the chart below may not be representative of the full sample.

Table 11. Education Requirements for IT Essentials Occupations in Bay Region

Education (minimum advertised)	Latest 12 Mos. Postings	Percent 12 Mos. Postings
High school or vocational training	1,358	27%
Associate's degree	553	11%
Bachelor's degree	3,058	62%

Source: Burning Glass

Methodology

Occupations for this report were identified by use of skills listed in O*Net descriptions and job descriptions in Burning Glass. Labor demand data is sourced from Economic Modeling Specialists International (EMSI) occupation data and Burning Glass job postings data. Educational supply and student outcomes data is retrieved from multiple sources, including CTE Launchboard and CCCCCO Data Mart.

Sources

- O*Net Online
- Labor Insight/Jobs (Burning Glass)
- Economic Modeling Specialists International (EMSI)
- CTE LaunchBoard www.calpassplus.org/Launchboard/
- Statewide CTE Outcomes Survey
- Employment Development Department Unemployment Insurance Dataset
- Living Insight Center for Community Economic Development
- Chancellor's Office MIS system

Contacts

For more information, please contact:

- Leila Jamoosian, Research Analyst, for Bay Area Community College Consortium (BACCC) and Centers of Excellence (CoE), leila@baccc.net
- John Carrese, Director, San Francisco Bay Center of Excellence for Labor Market Research, jcarrese@ccsf.edu or (415) 267-6544

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FOOTHILL COLLEGE
Temporary Program Creation Process
Feedback Form for New Programs

Until the new permanent program creation process has been determined, as part of the temporary program creation process this form shall be used by a department to gather feedback on a new program from key governance committees on campus. A complete program narrative and supporting documentation must be submitted to the groups listed below (simultaneous submission is recommended). Each committee will provide initial feedback via email within two weeks but might also provide additional feedback after their monthly meetings.

After a two-week period, regardless of whether feedback has been received from the three committees, the Division Curriculum Committee may consider the new program for approval. Following Division CC approval, please forward this completed form to the Office of Instruction.

Faculty Author(s): Mike Murphy and Bitia Mazloom
Division: STEM (PSME)

Program Title: Network Computing
Program Units: 13.5

Workforce/CTE Program (Y/N): Y
Please note that Workforce/CTE status is dependent on the TOP Code assigned to the program.

Type of Award:

- | | |
|--|---|
| <input type="checkbox"/> Non-transcriptable credit certificate | <input type="checkbox"/> AA/AS Degree (local) |
| <input checked="" type="checkbox"/> Certificate of Achievement | <input type="checkbox"/> AA-T/AS-T Degree (ADT) |
| <input type="checkbox"/> Noncredit certificate | |

EQUITY & EDUCATION https://foothill.edu/gov/equity-and-education/
Date of meeting:
Comments: Submitted to Equity & Education committee on February 11, 2021. No feedback has been received.

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REVENUE & RESOURCES https://foothill.edu/gov/revenue-and-resources/
Date of meeting:
Comments: Submitted to Revenue & Resources committee on February 11, 2021. No feedback has been received.

ADVISORY COUNCIL https://foothill.edu/gov/council/
Date of meeting:
Comments: Submitted to Advisory Council on February 11, 2021. No feedback has been received.

Division Curriculum Committee Approval Date: 2/25/21

Division CC Representative: Zach Cembellin

FOOTHILL COLLEGE
College Curriculum Committee
Guided Pathways Program Map Approval Process

Background

Guided Pathways Program Maps are an essential tool for helping Foothill College students achieve their educational goals in a timely fashion. In order for effective development of Program Maps to occur, it is essential that the Guided Pathways Team, **Counseling faculty**, department faculty/**chair**, and division dean work together to assure the viability of the Program Map. Because Program Maps are related to curriculum, the College Curriculum Committee is the most appropriate group for review and approval of finalized Maps.

Policy

The College Curriculum Committee hereby delegates the power to approve Guided Pathways Program Maps to the relevant Division Curriculum Committee.

Process

~~Faculty from the department~~ **Department faculty/chair** and the division dean will work in collaboration with the Guided Pathways Team **and Counseling faculty** to create the Guided Pathways Program Map. The Program Map must then be submitted to the Division Curriculum Committee for approval. The approved Program Map shall then be submitted to the College Curriculum Committee as an information item.

During its review, if the Division Curriculum Committee would like to request a revision to the Program Map, the Reps should follow up with the Guided Pathways Team.

If the Program Map includes ~~substantial~~ **core** coursework from a department outside of the Division, the relevant Division Curriculum Committees shall engage in collegial consultation before approving the final Program Map.