



2020-21
Annual Program Review

Sciences
(Biological Sciences , Allied Health, and Physical Sciences)

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Biological Sciences and Allied Health

(Biology, Ecology, Marine Science, and the Health Science Certificate)

Section 1: Program Planning

Internal Analysis and Program Effectiveness: Biology

Productivity	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Enrollment	61,279	63,824	60,164	61,368	59,444
Subject State-Funded Enrollment	3,343	3,747	3,544	3,823	4,159
State-Funded Resident FTES	6,073.30	6,343.88	5,929.28	6,189.33	6,104.88
Subject Resident FTES	446.12	514.36	496.91	540.88	610.26
Sections	75	92	100	111	127
Fill Rate	83.6%	83.2%	81.6%	80.6%	84.0%
WSCH/FTEF 595 Efficiency	643	583	567	597	561
FTEF/30	15.7	20.8	16.5	16.9	20.2
Extended Learning Enrollment	1,391	1,283	1,019	595	482

The percentage change in the number of Biology **enrollments** in 2018-19 showed a moderate increase from 2017-18 and a substantial increase from 2014-15.

The percentage change in 2018-19 **resident FTES** in Biology credit courses showed a substantial increase from 2017-18 and a substantial increase in comparison with resident FTES in 2014-15.

The percentage change in the number of **sections** in Biology courses in 2018-19 showed a substantial increase from 2017-18 and a substantial increase from the number of sections in 2014-15.

The percentage change in the **fill rate** in 2018-19 for Biology courses showed a slight increase from 2017-18 and a minimal difference in comparison with the fill rate in 2014-15.

The percentage change in the **WSCH/FTEF** ratio in Biology courses in 2018-19 showed a moderate decrease from 2017-18 and a substantial decrease from 2014-15.

The percentage change in the **FTEF/30** ratio for Biology courses in 2018-19 showed a substantial increase from 2017-18 and a substantial increase in comparison with the FTEF/30 ratio in 2014-15.

There was a substantial decrease in the number of Biology **Extended Learning enrollments** in 2018-19 from 2017-18 and a substantial decrease from 2014-15.

Calculation Categories

Language	Range
Minimal to No Difference	< 1.0%
Slight Increase/Decrease	Between 1.0% and 5.0%
Moderate Increase/Decrease	Between 5.1% and 10.0%
Substantial Increase/Decrease	> 10.0%

Comparison of Enrollment Trends	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Enrollment	61,279	63,824	60,164	61,368	59,444
Subject State-Funded Enrollment	3,343	3,747	3,544	3,823	4,159

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	34.2%	37.8%	38.7%	36.4%	37.0%
Online	44.3%	37.6%	42.8%	49.2%	48.3%
Hybrid	0.5%	1.6%	1.7%	0.6%	2.2%
Correspondence (Cable, Telecourse, Other DL)	20.9%	23.0%	16.7%	13.8%	12.6%

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	57.0%	55.6%	57.7%	59.1%	59.1%
Male	41.6%	43.0%	41.0%	39.4%	39.3%
Unknown	1.5%	1.4%	1.4%	1.5%	1.7%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	6.5%	7.3%	6.4%	6.3%	6.3%
American Indian/AK Native	0.2%	0.3%	0.3%	0.4%	0.2%
Asian	36.9%	38.2%	36.2%	34.1%	36.1%
Hispanic	13.6%	14.6%	15.0%	14.6%	15.5%
Pacific Islander/HI Native	0.3%	0.3%	0.4%	0.3%	0.5%
White	28.6%	25.5%	27.0%	28.2%	25.6%
Multi-Ethnicity	12.7%	12.6%	13.8%	15.5%	14.6%
Other/Unknown	1.2%	1.1%	0.8%	0.7%	1.2%

Age Group	2014-15	2015-16	2016-17	2017-18	2018-19
19 or Less	11.1%	9.2%	11.3%	10.4%	10.2%
20 to 24	38.7%	39.4%	38.8%	38.9%	42.5%
25 to 29	19.7%	20.8%	21.0%	21.6%	22.9%
30 to 34	9.9%	10.8%	10.4%	10.9%	10.2%
35 to 39	6.3%	6.4%	6.9%	6.6%	6.1%
40 to 49	8.2%	7.8%	7.0%	7.6%	7.2%
50 and Older	6.2%	5.7%	4.7%	4.1%	4.4%
Unknown	0.0%	0.0%	0.0%	0.0%	0.0%

Biology courses made up 7.0% of all state-funded enrollment for 2018-19. The percentage difference in Biology course **enrollment** in 2018-19 showed a moderate increase from 2017-18 and a substantial increase from 2014-15. Enrollment in Biology during 2018-19 showed 37.0% of courses were taught **traditional (face-to-face)**, 48.3% were taught **online**, 2.2% were taught in the **hybrid** modality, and 12.6% were taught in the **correspondence (cable, telecourse, and other distance learning)** modality.

In 2018-19, Biology enrollment consisted of 59.1% **female**, 39.3% **male**, and 1.7% students of **unknown** gender. In 2018-19, Biology enrollment consisted of 6.3% **African American** students, 0.2% **American Indian/AK Native** students, 36.1% **Asian** students, 15.5% **Hispanic** students, 0.5% **Pacific Islander/HI Native** students, 25.6% **White** students, 14.6% **multi-ethnic** students, and 1.2% students of **other** or **unknown** ethnicity. The age breakdown for 2018-19 enrollments in Biology revealed 10.2% aged **19 or less**, 42.5% aged **20 to 24**, 22.9% aged **25 to 29**, 10.2% aged **30 to 34**, 6.1% aged **35 to 39**, 7.2% aged **40 to 49**, 4.4% aged **50 and older**, and 0.0% **unknown**.

Success and Retention: Biology

Comparison of Success Rates	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Success Rate	65.4%	66.7%	68.6%	70.9%	72.2%
College Institution Set Standard Success Rate	55.4%	55.5%	56.7%	58.3%	59.8%
Subject Success Rate	74.7%	75.2%	77.1%	79.9%	75.0%

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	81.5%	85.3%	84.5%	84.2%	83.0%
Online	75.4%	75.6%	77.2%	80.9%	76.3%
Hybrid	72.2%	85.0%	91.8%	91.7%	95.6%
Correspondence (Cable, Telecourse, Other DL)	62.3%	57.4%	58.2%	64.8%	43.0%

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	76.7%	79.4%	79.9%	82.3%	79.3%
Male	71.7%	69.6%	73.1%	75.9%	68.6%
Unknown	83.7%	82.4%	77.1%	89.8%	74.3%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	47.2%	45.3%	56.4%	57.7%	50.6%
American Indian/AK Native	50.0%	58.3%	36.4%	71.4%	70.0%
Asian	83.2%	85.4%	85.2%	89.0%	86.7%
Hispanic	65.3%	63.6%	65.6%	70.3%	63.0%
Pacific Islander/HI Native	60.0%	38.5%	80.0%	90.9%	60.0%
White	77.2%	77.9%	80.7%	80.6%	74.9%
Multi-Ethnicity	70.0%	70.0%	72.2%	77.1%	70.8%
Other/Unknown	65.0%	83.3%	69.0%	72.0%	67.3%

Age Group	2014-15	2015-16	2016-17	2018-19	2018-19
19 or Less	78.4%	79.0%	86.0%	84.7%	79.9%
20 to 24	75.3%	80.4%	79.8%	83.7%	81.0%
25 to 29	73.3%	75.5%	74.3%	78.2%	75.3%
30 to 34	73.9%	64.8%	75.0%	76.9%	70.3%
35 to 39	70.6%	67.6%	68.4%	74.1%	67.3%
40 to 49	73.6%	66.2%	72.3%	72.2%	57.0%
50 and Older	75.6%	72.4%	69.9%	72.4%	60.4%
Unknown	-	-	-	-	-

The percentage difference in the **course success rate** in Biology courses in 2018-19 showed a moderate decrease from 2017-18 and a minimal difference from 2014-15. When comparing the percentage point difference in the Biology 2018-19 course success rate to the College's overall success average* (72.2%) and the institution-set standard* (59.8%) for credit course success, the Biology **course success rate** was slightly higher than the **college average** and substantially higher than the **institution-set standard** for credit course success.

When comparing the percentage point difference between instructional modalities to the overall Biology success rate for 2018-19, the success rate was a moderate increase for **traditional (face-to-face)** Biology

courses, a slight increase for **online** courses, a substantial increase for **hybrid courses**, and a substantial decrease for **correspondence (cable, telecourse, and other distance learning)** courses.

When comparing the percentage point difference between genders to the overall Biology success rate for 2018-19, the success rate was a slight increase for **female** students in Biology courses, a moderate decrease for **male** students, and a minimal difference for students of **unknown** gender.

When comparing the percentage point difference between ethnicity groups to the overall Biology success rate for 2018-19, the success rate was a substantial decrease for **African American** students in Biology courses, a moderate decrease for **American Indian/AK Native** students, a substantial increase for **Asian** students, a substantial decrease for **Hispanic** students, a substantial decrease for **Pacific Islander/HI Native** students, a minimal difference for **White** students, a slight decrease for **multi-ethnic** students, and a moderate decrease for students of **other** or **unknown** ethnicity.

When comparing the percentage point difference between age groups to the overall Biology success rate for 2018-19, the success rate was a slight increase for students aged **19 or less** in Biology courses, a moderate increase for students aged **20 to 24**, a minimal difference for students aged **25 to 29**, a slight decrease for students aged **30 to 34**, a moderate decrease for students aged **35 to 39**, a substantial decrease for students aged **40 to 49**, a substantial decrease for students aged **50 and older**, and no comparative data for students of unknown age.

Comparison of Retention Rates	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Retention Rate	82.3%	83.4%	83.7%	85.1%	86.1%
College Institution Set Standard Retention Rate	70.1%	70.0%	70.9%	71.1%	72.3%
Subject Retention Rate	86.6%	87.1%	88.3%	89.6%	87.9%

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	87.1%	88.4%	89.8%	89.9%	88.1%
Online	86.8%	86.9%	88.5%	89.6%	87.2%
Hybrid	77.8%	90.0%	93.4%	95.8%	97.8%
Correspondence (Cable, Telecourse, Other DL)	85.6%	84.9%	84.0%	88.3%	88.0%

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	86.7%	87.8%	89.1%	90.1%	87.3%
Male	86.2%	86.0%	87.1%	88.6%	88.7%
Unknown	91.8%	88.2%	91.7%	94.9%	85.7%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	78.7%	78.7%	80.6%	84.5%	81.0%
American Indian/AK Native	100.0%	83.3%	81.8%	78.6%	70.0%
Asian	90.0%	90.5%	91.5%	94.2%	92.7%
Hispanic	82.2%	84.4%	83.5%	85.0%	84.3%
Pacific Islander/HI Native	90.0%	92.3%	86.7%	90.9%	90.0%
White	87.4%	87.1%	90.3%	89.0%	85.9%
Multi-Ethnicity	82.9%	84.4%	85.3%	87.2%	86.2%
Other/Unknown	90.0%	88.1%	86.2%	84.0%	87.8%

Age Group	2014-15	2015-16	2016-17	2018-19	2018-19
19 or Less	87.3%	91.0%	92.0%	93.0%	89.1%
20 to 24	87.2%	88.8%	88.6%	91.0%	89.1%
25 to 29	84.1%	86.8%	88.3%	88.6%	87.6%
30 to 34	83.6%	80.5%	88.3%	88.2%	86.1%
35 to 39	84.8%	84.0%	84.0%	85.7%	88.6%
40 to 49	88.3%	85.2%	90.0%	87.3%	82.0%
50 and Older	93.2%	88.1%	81.3%	86.5%	87.9%
Unknown	-	-	-	-	-

The percentage difference in the **course retention rate** in Biology courses in 2018-19 showed a slight decrease from 2017-18 and a slight increase from 2014-15. When comparing the percentage point difference in the Biology 2018-19 course retention rate to the College's overall retention average* (86.1%) and the institution-set standard* (72.3%) for credit course retention, the Biology **course retention rate** was slightly higher than the **college average** and substantially higher than the **institution-set standard** for credit course retention.

When comparing the percentage point difference between instructional modalities to the overall Biology retention rate for 2018-19, the retention rate was a minimal difference for **traditional (face-to-face)** Biology courses, a minimal difference for **online** courses, a moderate increase for **hybrid courses**, and a minimal difference for **correspondence (cable, telecourse, and other distance learning)** courses.

When comparing the percentage point difference between genders to the overall Biology retention rate for 2018-19, the retention rate was a minimal difference for **female** students in Biology courses, a minimal difference for **male** students, and a slight decrease for students of **unknown** gender.

When comparing the percentage point difference between ethnicity groups to the overall Biology retention rate for 2018-19, the retention rate was a moderate decrease for **African American** students in Biology courses, a substantial decrease for **American Indian/AK Native** students, a slight increase for **Asian** students, a slight decrease for **Hispanic** students, a slight increase for **Pacific Islander/HI Native** students, a slight decrease for **White** students, a slight decrease for **multi-ethnic** students, and a minimal difference for students of **other** or **unknown** ethnicity.

When comparing the percentage point difference between age groups to the overall Biology retention rate for 2018-19, the retention rate was a slight increase for students aged **19 or less** in Biology courses, a slight increase for students aged **20 to 24**, a minimal difference for students aged **25 to 29**, a slight decrease for students aged **30 to 34**, a minimal difference for students aged **35 to 39**, a moderate decrease for students aged **40 to 49**, a minimal difference for students aged **50 and older**, and no comparative data for students of **unknown** age.

Internal Analysis and Program Effectiveness: Ecology

Productivity	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Enrollment	61,279	63,824	60,164	61,368	59,444
Subject State-Funded Enrollment	0	0	0	36	106
State-Funded Resident FTES	6,073.30	6,343.88	5,929.28	6,189.33	6,104.88
Subject Resident FTES	0.00	0.00	0.00	3.33	9.63
Sections	0	0	0	1	4
Fill Rate	0.0%	0.0%	0.0%	80.0%	83.3%
WSCH/FTEF 595 Efficiency	0	0	0	547	1,016
FTEF/30	0.0	0.0	0.0	0.1	0.2
Extended Learning Enrollment	96	35	11	0	0

The percentage change in the number of Ecology **enrollments** in 2018-19 showed a substantial increase from 2017-18 and no comparative data from 2014-15.

The percentage change in 2018-19 **resident FTES** in Ecology credit courses showed a substantial increase from 2017-18 and no comparative data in comparison with resident FTES in 2014-15.

The percentage change in the number of **sections** in Ecology courses in 2018-19 showed a substantial increase from 2017-18 and no comparative data from the number of sections in 2014-15.

The percentage change in the **fill rate** in 2018-19 for Ecology courses showed a slight increase from 2017-18 and no comparative data in comparison with the fill rate in 2014-15.

The percentage change in the **WSCH/FTEF** ratio in Ecology courses in 2018-19 showed a substantial increase from 2017-18 and no comparative data from 2014-15.

The percentage change in the **FTEF/30** ratio for Ecology courses in 2018-19 showed a substantial increase from 2017-18 and no comparative data in comparison with the FTEF/30 ratio in 2014-15.

There was no comparative data in the number of Ecology **Extended Learning enrollments** in 2018-19 from 2017-18 and a substantial decrease from 2014-15.

Calculation Categories

Language	Range
Minimal to No Difference	< 1.0%
Slight Increase/Decrease	Between 1.0% and 5.0%
Moderate Increase/Decrease	Between 5.1% and 10.0%
Substantial Increase/Decrease	> 10.0%

Comparison of Enrollment Trends	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Enrollment	61,279	63,824	60,164	61,368	59,444
Subject State-Funded Enrollment	0	0	0	36	106

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	0.0%	0.0%	0.0%	0.0%	0.0%
Online	0.0%	0.0%	0.0%	100.0%	100.0%
Hybrid	0.0%	0.0%	0.0%	0.0%	0.0%
Correspondence (Cable, Telecourse, Other DL)	0.0%	0.0%	0.0%	0.0%	0.0%

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	0.0%	0.0%	0.0%	75.0%	56.6%
Male	0.0%	0.0%	0.0%	22.2%	43.4%
Unknown	0.0%	0.0%	0.0%	2.8%	0.0%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	0.0%	0.0%	0.0%	16.7%	7.5%
American Indian/AK Native	0.0%	0.0%	0.0%	0.0%	0.9%
Asian	0.0%	0.0%	0.0%	16.7%	12.3%
Hispanic	0.0%	0.0%	0.0%	25.0%	11.3%
Pacific Islander/HI Native	0.0%	0.0%	0.0%	0.0%	0.0%
White	0.0%	0.0%	0.0%	25.0%	45.3%
Multi-Ethnicity	0.0%	0.0%	0.0%	16.7%	22.6%
Other/Unknown	0.0%	0.0%	0.0%	0.0%	0.0%

Age Group	2014-15	2015-16	2016-17	2017-18	2018-19
19 or Less	0.0%	0.0%	0.0%	16.7%	15.1%
20 to 24	0.0%	0.0%	0.0%	30.6%	102.8%
25 to 29	0.0%	0.0%	0.0%	25.0%	17.0%
30 to 34	0.0%	0.0%	0.0%	11.1%	10.4%
35 to 39	0.0%	0.0%	0.0%	8.3%	5.7%
40 to 49	0.0%	0.0%	0.0%	2.8%	8.5%
50 and Older	0.0%	0.0%	0.0%	5.6%	8.5%
Unknown	0.0%	0.0%	0.0%	0.0%	0.0%

Ecology courses made up 0.2% of all state-funded enrollment for 2018-19. The percentage difference in Ecology course **enrollment** in 2018-19 showed a substantial increase from 2017-18 and no comparative data from 2014-15. Enrollment in Ecology during 2018-19 showed 0.0% of courses were taught **traditional (face-to-face)**, 100.0% were taught **online**, 0.0% were taught in the **hybrid** modality, and 0.0% were taught in the **correspondence (cable, telecourse, and other distance learning)** modality.

In 2018-19, Ecology enrollment consisted of 56.6% **female**, 43.4% **male**, and 0.0% students of **unknown** gender. In 2018-19, Ecology enrollment consisted of 7.5% **African American** students, 0.9% **American Indian/AK Native** students, 12.3% **Asian** students, 11.3% **Hispanic** students, 0.0% **Pacific Islander/HI Native** students, 45.3% **White** students, 22.6% **multi-ethnic** students, and 0.0% students of **other** or **unknown** ethnicity. The age breakdown for 2018-19 enrollments in Ecology revealed 15.1% aged **19 or less**, 102.8% aged **20 to 24**, 17.0% aged **25 to 29**, 10.4% aged **30 to 34**, 5.7% aged **35 to 39**, 8.5% aged **40 to 49**, 8.5% aged **50 and older**, and 0.0% **unknown**.

Success and Retention: Ecology

Comparison of Success Rates	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Success Rate	65.4%	66.7%	68.6%	70.9%	72.2%
College Institution Set Standard Success Rate	55.4%	55.5%	56.7%	58.3%	59.8%
Subject Success Rate	0.0%	0.0%	0.0%	75.0%	65.1%

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	-	-	-	-	-
Online	-	-	-	75.0%	65.1%
Hybrid	-	-	-	-	-
Correspondence (Cable, Telecourse, Other DL)	-	-	-	-	-

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	0.0%	0.0%	0.0%	77.8%	60.0%
Male	0.0%	0.0%	0.0%	62.5%	71.7%
Unknown	0.0%	-	-	100.0%	-

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	0.0%	0.0%	0.0%	50.0%	37.5%
American Indian/AK Native	-	-	-	-	100.0%
Asian	0.0%	0.0%	0.0%	66.7%	92.3%
Hispanic	0.0%	0.0%	-	88.9%	50.0%
Pacific Islander/HI Native	-	-	-	-	-
White	0.0%	0.0%	0.0%	66.7%	70.8%
Multi-Ethnicity	0.0%	0.0%	0.0%	100.0%	54.2%
Other/Unknown	0.0%	-	-	-	-

Age Group	2014-15	2015-16	2016-17	2018-19	2018-19
19 or Less	-	-	-	66.7%	87.5%
20 to 24	0.0%	-	0.0%	81.8%	59.5%
25 to 29	0.0%	0.0%	0.0%	88.9%	61.1%
30 to 34	0.0%	-	0.0%	50.0%	72.7%
35 to 39	0.0%	0.0%	0.0%	66.7%	66.7%
40 to 49	0.0%	0.0%	0.0%	0.0%	44.4%
50 and Older	0.0%	0.0%	0.0%	100.0%	66.7%
Unknown	-	-	-	-	-

The percentage difference in the **course success rate** in Ecology courses in 2018-19 showed a substantial decrease from 2017-18 and no comparative data from 2014-15. When comparing the percentage point difference in the Ecology 2018-19 course success rate to the College's overall success average* (72.2%) and the institution-set standard* (59.8%) for credit course success, the Ecology **course success rate** was moderately lower than the **college average** and moderately higher than the **institution-set standard** for credit course success.

When comparing the percentage point difference between instructional modalities to the overall Ecology success rate for 2018-19, the success rate was no comparative data for **traditional (face-to-face)** Ecology

courses, a minimal difference for **online** courses, no comparative data for **hybrid courses**, and no comparative data for **correspondence (cable, telecourse, and other distance learning)** courses.

When comparing the percentage point difference between genders to the overall Ecology success rate for 2018-19, the success rate was a moderate decrease for **female** students in Ecology courses, a moderate increase for **male** students, and no comparative data for students of **unknown** gender.

When comparing the percentage point difference between ethnicity groups to the overall Ecology success rate for 2018-19, the success rate was a substantial decrease for **African American** students in Ecology courses, a substantial increase for **American Indian/AK Native** students, a substantial increase for **Asian** students, a substantial decrease for **Hispanic** students, no comparative data for **Pacific Islander/HI Native** students, a moderate increase for **White** students, a substantial decrease for **multi-ethnic** students, and no comparative data for students of **other** or **unknown** ethnicity.

When comparing the percentage point difference between age groups to the overall Ecology success rate for 2018-19, the success rate was a substantial increase for students aged **19 or less** in Ecology courses, a moderate decrease for students aged **20 to 24**, a slight decrease for students aged **25 to 29**, a moderate increase for students aged **30 to 34**, a slight increase for students aged **35 to 39**, a substantial decrease for students aged **40 to 49**, a slight increase for students aged **50 and older**, and no comparative data for students of unknown age.

Comparison of Retention Rates	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Retention Rate	82.3%	83.4%	83.7%	85.1%	86.1%
College Institution Set Standard Retention Rate	70.1%	70.0%	70.9%	71.1%	72.3%
Subject Retention Rate	0.0%	0.0%	0.0%	83.3%	84.0%

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	-	-	-	-	-
Online	-	-	-	83.3%	84.0%
Hybrid	-	-	-	-	-
Correspondence (Cable, Telecourse, Other DL)	-	-	-	-	-

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	0.0%	0.0%	0.0%	85.2%	78.3%
Male	0.0%	0.0%	0.0%	75.0%	91.3%
Unknown	0.0%	-	-	100.0%	-

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	0.0%	0.0%	0.0%	66.7%	75.0%
American Indian/AK Native	-	-	-	-	100.0%
Asian	0.0%	0.0%	0.0%	83.3%	100.0%
Hispanic	0.0%	0.0%	-	88.9%	75.0%
Pacific Islander/HI Native	-	-	-	-	-
White	0.0%	0.0%	0.0%	77.8%	81.3%
Multi-Ethnicity	0.0%	0.0%	0.0%	100.0%	87.5%
Other/Unknown	0.0%	-	-	-	-

Age Group	2014-15	2015-16	2016-17	2018-19	2018-19
19 or Less	-	-	-	83.3%	100.0%
20 to 24	0.0%	-	0.0%	81.8%	75.7%
25 to 29	0.0%	0.0%	0.0%	100.0%	77.8%
30 to 34	0.0%	-	0.0%	75.0%	90.9%
35 to 39	0.0%	0.0%	0.0%	66.7%	83.3%
40 to 49	0.0%	0.0%	0.0%	0.0%	88.9%
50 and Older	0.0%	0.0%	0.0%	100.0%	88.9%
Unknown	-	-	-	-	-

The percentage difference in the **course retention rate** in Ecology courses in 2018-19 showed a minimal difference from 2017-18 and no comparative data from 2014-15. When comparing the percentage point difference in the Ecology 2018-19 course retention rate to the College's overall retention average* (86.1%) and the institution-set standard* (72.3%) for credit course retention, the Ecology **course retention rate** was slightly lower than the **college average** and substantially higher than the **institution-set standard** for credit course retention.

When comparing the percentage point difference between instructional modalities to the overall Ecology retention rate for 2018-19, the retention rate was no comparative data for **traditional (face-to-face)** Ecology courses, a minimal difference for **online** courses, no comparative data for **hybrid courses**, and no comparative data for **correspondence (cable, telecourse, and other distance learning)** courses.

When comparing the percentage point difference between genders to the overall Ecology retention rate for 2018-19, the retention rate was a moderate decrease for **female** students in Ecology courses, a moderate increase for **male** students, and no comparative data for students of **unknown** gender.

When comparing the percentage point difference between ethnicity groups to the overall Ecology retention rate for 2018-19, the retention rate was a moderate decrease for **African American** students in Ecology courses, a substantial increase for **American Indian/AK Native** students, a substantial increase for **Asian** students, a moderate decrease for **Hispanic** students, no comparative data for **Pacific Islander/HI Native** students, a slight decrease for **White** students, a slight increase for **multi-ethnic** students, and no comparative data for students of **other** or **unknown** ethnicity.

When comparing the percentage point difference between age groups to the overall Ecology retention rate for 2018-19, the retention rate was a substantial increase for students aged **19 or less** in Ecology courses, a moderate decrease for students aged **20 to 24**, a moderate decrease for students aged **25 to 29**, a moderate increase for students aged **30 to 34**, a minimal difference for students aged **35 to 39**, a slight increase for students aged **40 to 49**, a slight increase for students aged **50 and older**, and no comparative data for students of **unknown** age.

Internal Analysis and Program Effectiveness: Marine Science

Productivity	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Enrollment	61,279	63,824	60,164	61,368	59,444
Subject State-Funded Enrollment	480	528	498	660	589
State-Funded Resident FTES	6,073.30	6,343.88	5,929.28	6,189.33	6,104.88
Subject Resident FTES	44.01	47.06	45.08	61.02	55.81
Sections	5	5	5	7	10
Fill Rate	69.6%	76.5%	68.9%	79.7%	70.0%
WSCH/FTEF 595 Efficiency	1,288	1,331	1,175	1,210	1,219
FTEF/30	0.6	0.6	0.6	0.8	0.7
Extended Learning Enrollment	191	146	114	101	56

The percentage change in the number of Marine Science **enrollments** in 2018-19 showed a substantial decrease from 2017-18 and a substantial increase from 2014-15.

The percentage change in 2018-19 **resident FTES** in Marine Science credit courses showed a moderate decrease from 2017-18 and a substantial increase in comparison with resident FTES in 2014-15.

The percentage change in the number of **sections** in Marine Science courses in 2018-19 showed a substantial increase from 2017-18 and a substantial increase from the number of sections in 2014-15.

The percentage change in the **fill rate** in 2018-19 for Marine Science courses showed a substantial decrease from 2017-18 and a minimal difference in comparison with the fill rate in 2014-15.

The percentage change in the **WSCH/FTEF** ratio in Marine Science courses in 2018-19 showed a minimal difference from 2017-18 and a moderate decrease from 2014-15.

The percentage change in the **FTEF/30** ratio for Marine Science courses in 2018-19 showed a substantial decrease from 2017-18 and a substantial increase in comparison with the FTEF/30 ratio in 2014-15.

There was a substantial decrease in the number of Marine Science **Extended Learning enrollments** in 2018-19 from 2017-18 and a substantial decrease from 2014-15.

Calculation Categories

Language	Range
Minimal to No Difference	< 1.0%
Slight Increase/Decrease	Between 1.0% and 5.0%
Moderate Increase/Decrease	Between 5.1% and 10.0%
Substantial Increase/Decrease	> 10.0%

Comparison of Enrollment Trends	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Enrollment	61,279	63,824	60,164	61,368	59,444
Subject State-Funded Enrollment	480	528	498	660	589

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	0.0%	0.0%	1.8%	1.4%	1.0%
Online	0.0%	0.9%	11.0%	22.3%	18.3%
Hybrid	0.0%	0.0%	0.0%	0.0%	0.0%
Correspondence (Cable, Telecourse, Other DL)	100.0%	99.1%	87.1%	76.4%	80.6%

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	14.8%	11.7%	12.0%	16.8%	12.1%
Male	84.4%	88.1%	86.7%	82.0%	85.9%
Unknown	0.8%	0.2%	1.2%	1.2%	2.0%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	14.4%	12.5%	13.7%	10.6%	14.9%
American Indian/AK Native	1.7%	2.1%	1.2%	1.5%	1.2%
Asian	9.4%	5.3%	6.0%	7.9%	6.1%
Hispanic	17.9%	24.2%	26.3%	22.6%	25.8%
Pacific Islander/HI Native	0.4%	1.1%	0.8%	0.5%	0.5%
White	41.0%	42.6%	41.4%	41.5%	38.0%
Multi-Ethnicity	13.1%	10.8%	9.2%	14.5%	12.4%
Other/Unknown	2.1%	1.3%	1.4%	0.9%	1.0%

Age Group	2014-15	2015-16	2016-17	2017-18	2018-19
19 or Less	5.2%	1.9%	2.6%	7.1%	4.9%
20 to 24	17.9%	14.2%	13.3%	12.4%	10.2%
25 to 29	17.9%	18.2%	17.5%	17.0%	14.6%
30 to 34	16.0%	15.9%	19.3%	15.9%	15.6%
35 to 39	12.9%	16.1%	14.7%	12.1%	17.0%
40 to 49	18.8%	23.3%	19.9%	23.3%	21.6%
50 and Older	11.3%	10.4%	12.9%	12.1%	14.9%
Unknown	0.0%	0.0%	0.0%	0.0%	0.0%

Marine Science courses made up 1.0% of all state-funded enrollment for 2018-19. The percentage difference in Marine Science course **enrollment** in 2018-19 showed a substantial decrease from 2017-18 and a substantial increase from 2014-15. Enrollment in Marine Science during 2018-19 showed 1.0% of courses were taught **traditional (face-to-face)**, 18.3% were taught **online**, 0.0% were taught in the **hybrid** modality, and 80.6% were taught in the **correspondence (cable, telecourse, and other distance learning)** modality.

In 2018-19, Marine Science enrollment consisted of 12.1% **female**, 85.9% **male**, and 2.0% students of **unknown** gender. In 2018-19, Marine Science enrollment consisted of 14.9% **African American** students, 1.2% **American Indian/AK Native** students, 6.1% **Asian** students, 25.8% **Hispanic** students, 0.5% **Pacific Islander/HI Native** students, 38.0% **White** students, 12.4% **multi-ethnic** students, and 1.0% students of **other** or **unknown** ethnicity. The age breakdown for 2018-19 enrollments in Marine Science revealed 4.9% aged **19 or less**, 10.2% aged **20 to 24**, 14.6% aged **25 to 29**, 15.6% aged **30 to 34**, 17.0% aged **35 to 39**, 21.6% aged **40 to 49**, 14.9% aged **50 and older**, and 0.0% **unknown**.

Success and Retention: Marine Science

Comparison of Success Rates	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Success Rate	65.4%	66.7%	68.6%	70.9%	72.2%
College Institution Set Standard Success Rate	55.4%	55.5%	56.7%	58.3%	59.8%
Subject Success Rate	57.9%	63.6%	64.5%	75.0%	74.5%

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	-	-	100.0%	66.7%	83.3%
Online	-	100.0%	78.2%	89.1%	75.0%
Hybrid	-	-	-	-	-
Correspondence (Cable, Telecourse, Other DL)	57.9%	63.3%	62.0%	71.0%	74.3%

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	52.1%	71.0%	78.3%	86.5%	71.8%
Male	59.3%	62.8%	62.3%	73.0%	75.1%
Unknown	25.0%	0.0%	83.3%	50.0%	66.7%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	50.7%	57.6%	47.1%	61.4%	71.6%
American Indian/AK Native	62.5%	72.7%	83.3%	50.0%	71.4%
Asian	64.4%	78.6%	86.7%	86.5%	88.9%
Hispanic	52.3%	55.5%	60.3%	72.5%	72.4%
Pacific Islander/HI Native	50.0%	16.7%	50.0%	33.3%	66.7%
White	61.4%	67.6%	71.8%	81.0%	75.9%
Multi-Ethnicity	57.1%	68.4%	50.0%	68.8%	71.2%
Other/Unknown	60.0%	71.4%	85.7%	83.3%	83.3%

Age Group	2014-15	2015-16	2016-17	2018-19	2018-19
19 or Less	68.0%	80.0%	61.5%	89.4%	75.9%
20 to 24	54.7%	58.7%	75.8%	84.1%	76.1%
25 to 29	52.3%	56.3%	57.5%	67.9%	72.1%
30 to 34	63.6%	66.7%	60.4%	75.2%	77.2%
35 to 39	51.6%	62.4%	63.0%	81.3%	79.0%
40 to 49	62.2%	65.0%	66.7%	70.1%	70.1%
50 and Older	59.3%	74.5%	67.2%	70.0%	73.9%
Unknown	-	-	-	-	-

The percentage difference in the **course success rate** in Marine Science courses in 2018-19 showed a minimal difference from 2017-18 and a substantial increase from 2014-15. When comparing the percentage point difference in the Marine Science 2018-19 course success rate to the College's overall success average* (72.2%) and the institution-set standard* (59.8%) for credit course success, the Marine Science **course success rate** was slightly higher than the **college average** and substantially higher than the **institution-set standard** for credit course success.

When comparing the percentage point difference between instructional modalities to the overall Marine Science success rate for 2018-19, the success rate was a moderate increase for **traditional (face-to-face)**

Marine Science courses, a minimal difference for **online** courses, no comparative data for **hybrid courses**, and a minimal difference for **correspondence (cable, telecourse, and other distance learning)** courses.

When comparing the percentage point difference between genders to the overall Marine Science success rate for 2018-19, the success rate was a slight decrease for **female** students in Marine Science courses, a minimal difference for **male** students, and a moderate decrease for students of **unknown** gender.

When comparing the percentage point difference between ethnicity groups to the overall Marine Science success rate for 2018-19, the success rate was a slight decrease for **African American** students in Marine Science courses, a slight decrease for **American Indian/AK Native** students, a substantial increase for **Asian** students, a slight decrease for **Hispanic** students, a moderate decrease for **Pacific Islander/HI Native** students, a slight increase for **White** students, a slight decrease for **multi-ethnic** students, and a moderate increase for students of **other** or **unknown** ethnicity.

When comparing the percentage point difference between age groups to the overall Marine Science success rate for 2018-19, the success rate was a slight increase for students aged **19 or less** in Marine Science courses, a slight increase for students aged **20 to 24**, a slight decrease for students aged **25 to 29**, a slight increase for students aged **30 to 34**, a slight increase for students aged **35 to 39**, a slight decrease for students aged **40 to 49**, a minimal difference for students aged **50 and older**, and no comparative data for students of unknown age.

Comparison of Retention Rates	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Retention Rate	82.3%	83.4%	83.7%	85.1%	86.1%
College Institution Set Standard Retention Rate	70.1%	70.0%	70.9%	71.1%	72.3%
Subject Retention Rate	79.8%	80.3%	84.9%	89.4%	91.2%

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	-	-	100.0%	88.9%	100.0%
Online	-	100.0%	90.9%	98.0%	85.2%
Hybrid	-	-	-	-	-
Correspondence (Cable, Telecourse, Other DL)	79.8%	80.1%	83.9%	86.9%	92.4%

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	71.8%	91.9%	90.0%	95.5%	87.3%
Male	81.0%	78.9%	84.3%	88.4%	91.9%
Unknown	100.0%	0.0%	83.3%	75.0%	83.3%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	81.2%	83.3%	83.8%	85.7%	92.0%
American Indian/AK Native	75.0%	90.9%	100.0%	80.0%	85.7%
Asian	80.0%	82.1%	93.3%	92.3%	94.4%
Hispanic	74.4%	77.3%	83.2%	87.9%	90.1%
Pacific Islander/HI Native	100.0%	50.0%	75.0%	66.7%	100.0%
White	81.7%	81.3%	84.5%	92.0%	92.0%
Multi-Ethnicity	77.8%	80.7%	84.8%	86.5%	89.0%
Other/Unknown	90.0%	71.4%	100.0%	100.0%	83.3%

Age Group	2014-15	2015-16	2016-17	2018-19	2018-19
19 or Less	80.0%	90.0%	92.3%	95.7%	89.7%
20 to 24	77.9%	80.0%	92.4%	98.8%	88.1%
25 to 29	77.9%	76.0%	87.4%	86.6%	89.5%
30 to 34	81.8%	79.8%	78.1%	90.5%	90.2%
35 to 39	82.3%	78.8%	79.5%	87.5%	97.0%
40 to 49	77.8%	82.9%	86.9%	87.0%	88.2%
50 and Older	83.3%	83.6%	85.9%	85.0%	94.3%
Unknown	-	-	-	-	-

The percentage difference in the **course retention rate** in Marine Science courses in 2018-19 showed a slight increase from 2017-18 and a substantial increase from 2014-15. When comparing the percentage point difference in the Marine Science 2018-19 course retention rate to the College's overall retention average* (86.1%) and the institution-set standard* (72.3%) for credit course retention, the Marine Science **course retention rate** was moderately higher than the **college average** and substantially higher than the **institution-set standard** for credit course retention.

When comparing the percentage point difference between instructional modalities to the overall Marine Science retention rate for 2018-19, the retention rate was a moderate increase for **traditional (face-to-face)** Marine Science courses, a moderate decrease for **online** courses, no comparative data for **hybrid courses**, and a slight increase for **correspondence (cable, telecourse, and other distance learning)** courses.

When comparing the percentage point difference between genders to the overall Marine Science retention rate for 2018-19, the retention rate was a slight decrease for **female** students in Marine Science courses, a minimal difference for **male** students, and a moderate decrease for students of **unknown** gender.

When comparing the percentage point difference between ethnicity groups to the overall Marine Science retention rate for 2018-19, the retention rate was a minimal difference for **African American** students in Marine Science courses, a moderate decrease for **American Indian/AK Native** students, a slight increase for **Asian** students, a slight decrease for **Hispanic** students, a moderate increase for **Pacific Islander/HI Native** students, a minimal difference for **White** students, a slight decrease for **multi-ethnic** students, and a moderate decrease for students of **other** or **unknown** ethnicity.

When comparing the percentage point difference between age groups to the overall Marine Science retention rate for 2018-19, the retention rate was a slight decrease for students aged **19 or less** in Marine Science courses, a slight decrease for students aged **20 to 24**, a slight decrease for students aged **25 to 29**, a minimal difference for students aged **30 to 34**, a moderate increase for students aged **35 to 39**, a slight decrease for students aged **40 to 49**, a slight increase for students aged **50 and older**, and no comparative data for students of **unknown** age.

Program Awards

Awards	2014-15	2015-16	2016-17	2017-18	2018-19
Degrees (Coastline Total)	1,609	1,893	2,074	2,025	2,188
Subject Degrees Awarded	122	154	147	188	183
Certificates (Coastline Total)	692	600	602	628	709
Subject Certificates Awarded	23	17	24	44	58

The percentage change in the number of Biology degrees awarded in 2018-19 showed a slight decrease from 2017-18 and a substantial increase from the number of degrees awarded in 2014-15.

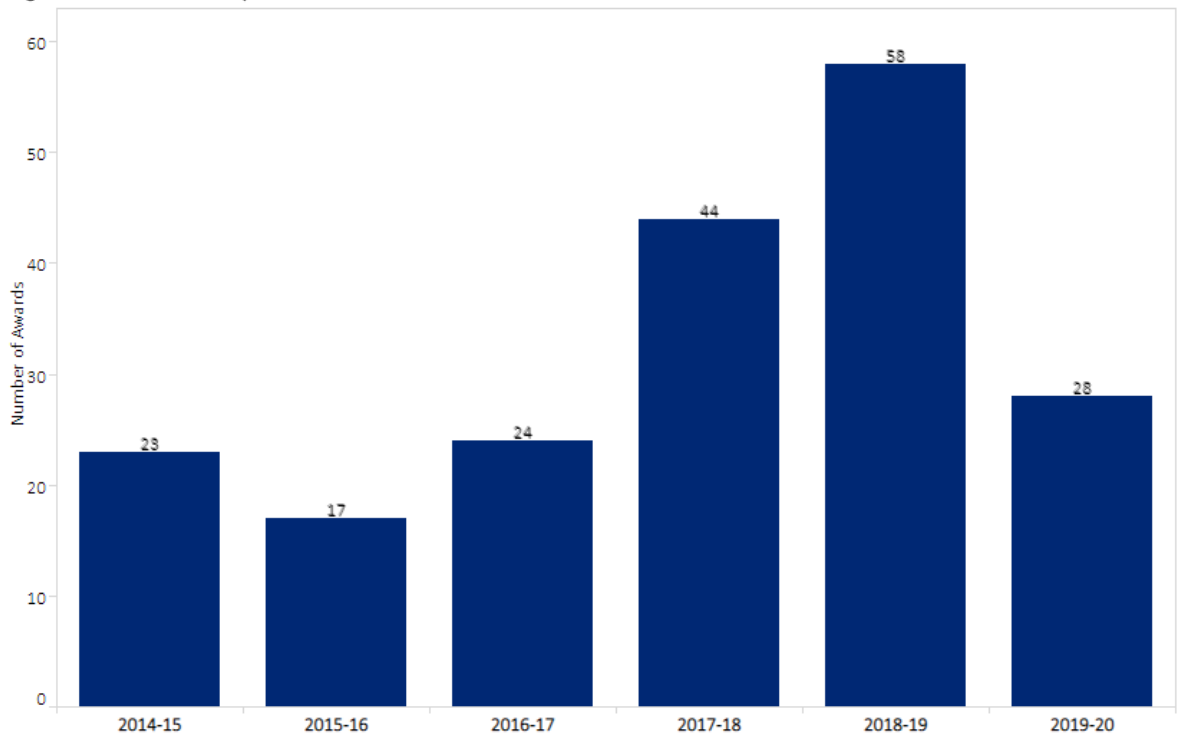
The percentage change in the number of Biology certificates awarded in 2018-19 showed a substantial increase from 2017-18 and showed a substantial increase in comparison with the number of certificates awarded in 2014-15.

Internal Analysis: Health Science Certificate of Achievement

This program prepares students for entry into health professional programs or jobs in the medical field. Coursework provides many of the science prerequisites for programs in health professions such as nursing, physician assistant, pharmacy, physical therapy, occupational therapy, dental hygiene, radiology technology, dentist, and medical doctor.

We had been showing a steady increase in Certificate attainment, with an all-time high of 58 certificates awarded in 2018-2019. There was a significant dropoff in 2019-2020, however this is at least partially contributed to a decrease in certificates awarded in spring 2020 due to COVID-19.

Degrees and Certificates by Year



Degrees and Certificates by Major

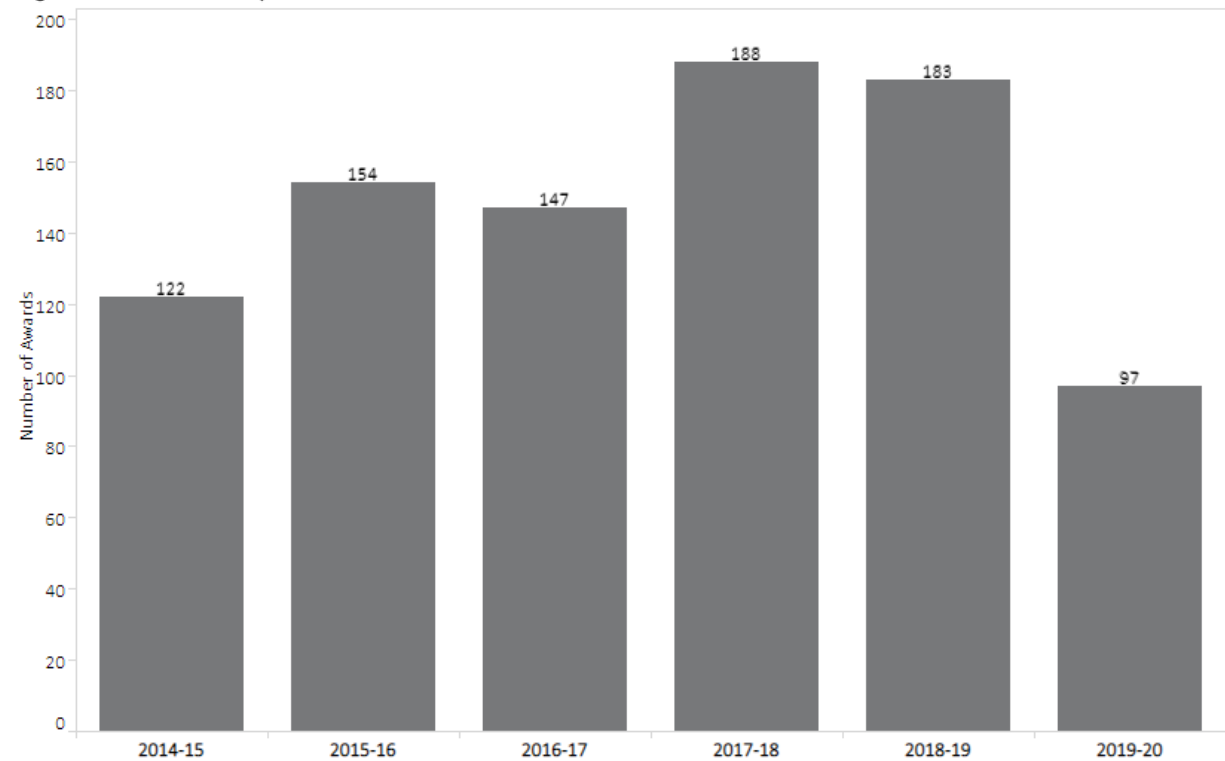
Major	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
SCI: Health Science	23	17	24	44	58	28

Internal Analysis: Science and Math - Associate of Arts Degree

Courses in the Science and Math area develop an understanding of mathematical and scientific methods and knowledge. Continuing study in science and math will prepare students for a wide range of careers in technology, the health field, education, research, engineering, and business.

Some university majors within Science and Math include: Accounting, Astronomy, Biology, Biotechnology, Botany, Chemistry, Computer Science, Ecology, Education, Engineering, Marketing, Math, Medicine, Microbiology, Nursing, Pharmacy, Physics, and Veterinary Medicine.

Degrees and Certificates by Year



Degrees and Certificates by Major

Major	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
SCI: Liberal Arts: Science & Math	122	154	147	188	183	97

Equity

Focusing on Biology the demographics of students enrolled in classes is very similar to the overall breakdown of the college as a whole, with a couple of exceptions. African Americans make up 10% of the college headcount, but only 6% of the biology enrollments. Also, Asian Americans make up roughly 20% of the college headcount, but 36% of the biology enrollments. In addition, the overall college gender breakdown is about 55% male and 45% female, but the biology department enrollments show 60% female and 40% male.

As for success rates, the overall Biology success rate was 75%. However, the African America success rate was 50% and the Hispanic success rate was 63%. Also the female success rate was over 10% higher (79%) than the male success rate (68%).

In analysis of course retention, there did not seem to be any patterns in regards to demographics for the Biology program as a whole.

Achievement

As mentioned above, there are some achievement gaps in regards to race and gender as shown by overall success rates in the Biology courses. Also, there were significant decreases in the number of Health Science Certificates of Achievement and Science & Math Associates degrees awarded as compared to the previous year (although much of this could be attributed to COVID-19).

Program Efficiency

The Subject State-Funded Enrollment and Subject Resident FTES have been steadily increasing as well as fill-rate. However, the WSCH/FTEF 595 Efficiency numbers are below the benchmark of 595. The department co-chairs are currently working with the division Dean to increase efficiency through course scheduling and section consolidation.

Student (SLOs) and Program Student Learning Outcomes (PSLOs)

1. SLOs data collection is coordinated by the Dean of Institutional Research, Planning, Effectiveness and Grant Development and SLO coordinator(s). Each instructor can use the assessment tool of his/her choice.
2. Between Fall 2019-Spring 2020, 7 courses were scheduled to report SLOs. Of those 7 courses, at least one section of each course reported SLO data into the SLO cloud except for Biol C221 (SLO data was collected in Summer for this class). The sections that did report data are found in the table below.

SLO Assessment and Plan

Course	SLO	Method(s) of Assessment	Participant(s) in the Planning Discussion	Recommended Changes
Biol C120 – Biology of Aging	<i>Communicate normal and abnormal changes that accompany aging as well as the ability to adapt.</i>	Written Assignment	Dorrie Talmage	None Provided in SLO Cloud. SLO discussion is planned for Fall Flex Day Department meeting
	<i>Investigate disease and normal aging processes, document changes to body systems, and support conclusions with valid research principles.</i>	Written Assignment	Dorrie Talmage	None Provided in SLO Cloud. SLO discussion is planned for Fall Flex Day Department meeting
	<i>Interpret and apply major biological theories and principles of aging to determine their impact and implication on the individual and society as a whole.</i>	Written Assignment	Dorrie Talmage	None Provided in SLO Cloud. SLO discussion is planned for Fall Flex Day Department meeting
Biol C104 – Medical Terminology for Helath Professionals	<i>Identify and interpret different prefixes, suffixes, and word roots used in the language of Medicine</i>	Performance	Dr Tracey Magrann	None Provided in SLO Cloud. SLO discussion is planned for Fall Flex Day Department meeting
	<i>Analyze medical terms and break them down to their original components and describe their meaning</i>	Performance	Dr Tracey Magrann	None Provided in SLO Cloud. SLO discussion is planned for Fall Flex Day Department meeting
	<i>Formulate and construct medical terms using the three basic elements to describe different pathological conditions and tests used in the diagnosis as well as the procedures used for the treatments of these conditions.</i>	Comprehensiveness	Dr Tracey Magrann	None Provided in SLO Cloud. SLO discussion is planned for Fall Flex Day Department meeting
Biol C200 - Pharmacology	<i>Describe in detail basic principles of pharmacology including pharmacokinetics.</i>	Test/Exam/Quiz	Dr Tracey Magrann	None Provided in SLO Cloud. SLO discussion is planned for Fall Flex Day Department meeting
	<i>Examine in detail scientific classifications of drugs and analyze the basis for rational therapeutics.</i>	Test/Exam/Quiz	Dr Tracey Magrann	None Provided in SLO Cloud. SLO discussion is planned for Fall Flex Day Department meeting
	<i>Identify typical drugs applied to common pathologies, body system disorders, and clinical procedures.</i>	Comprehensiveness	Dr Tracey Magrann	None Provided in SLO Cloud. SLO discussion is planned for Fall Flex

				Day Department meeting
Biol C281 - Biochemistry	<i>Describe the fundamental chemical principles and reactions involved in biochemical processes and explain the structure, function, and regulation of metabolic pathways.</i>	Pre/Post Test	Steve Fauce	None Provided in SLO Cloud. SLO discussion is planned for Fall Flex Day Department meeting
	<i>Read, evaluate, cite, and explain biochemistry-related developments published in peer-reviewed journals.</i>	Pre/Post Test	Steve Fauce	None Provided in SLO Cloud. SLO discussion is planned for Fall Flex Day Department meeting
	<i>Apply knowledge of bioenergetics and metabolic pathways to solve biological problems.</i>	Pre/Post Test	Steve Fauce	None Provided in SLO Cloud. SLO discussion is planned for Fall Flex Day Department meeting
Biol C102 – Introduction to the Concepts of Anatomy and Physiology	<i>Correlate the structure of specific organs to their functions and the way that organ works to maintain homeostasis</i>	Not indicated	Deborah Henry	As indicated in SLO Cloud: First semester using the OER that I modified for the course. Good reception. SLO discussion is planned for Fall Flex Day Department meeting
	<i>Identify organs of each body system and describe how they work together to perform the functions of that system.</i>	Not indicated	Deborah Henry	First semester using the OER that I modified for the course. Good reception. SLO discussion is planned for Fall Flex Day Department meeting
Biol C221 – Introduction to Anatomy and Physiology	<i>Correlate the structure of specific organs to their functions and the way that organ works to maintain homeostasis.</i>	No data in SLO Cloud	No data in SLO Cloud	No data in SLO Cloud
	<i>Identify organs of each body system and describe how they work together to perform the functions of that system.</i>	No data in SLO Cloud	No data in SLO Cloud	No data in SLO Cloud
Biol C283 - Genetics	<i>Describe the principal structures, organization and molecular mechanisms involved in the transmission of genetic information and how DNA mutations affect these processes</i>	Pre/Post Test	Steve Fauce	As indicated in SLO Cloud: Overall response is very strong for this SLO. No suggestions for improvement. SLO discussion is planned for Fall Flex Day Department meeting

	<i>Summarize and evaluate the hypotheses, experimental design, results and conclusions in a genetics-related journal article from primary research literature</i>	Pre/Post Test	Steve Fauce	As indicated in SLO Cloud: I will incorporate more assigned journal article reading in addition to the existing journal club presentation. SLO discussion is planned for Fall Flex Day Department meeting
	<i>Knowledgeably discuss ethical implications of emerging genetic technologies</i>	Pre/Post Test	Steve Fauce	As indicated in SLO Cloud: Overall response is very strong for this SLO. No suggestions for improvement. SLO discussion is planned for Fall Flex Day Department meeting
	<i>Utilize concepts in Mendelian genetics to analyze data and solve common problems in transmission genetics.</i>	Pre/Post Test	Steve Fauce	As indicated in SLO Cloud: Students are currently assigned problem sets to complete as a group. Some students may not be able to get the practice they need in this format. In the future, some individual problem sets will be incorporated. SLO discussion is planned for Fall Flex Day Department meeting

PSLO Results

PSLO	Method(s) of Assessment	Participant(s) in the Planning Discussion	Recommended Changes
The only program currently enrolling students within the Life Sciences department is the Health Sciences Certificate of Achievement.	Currently data is not being tabulated for the Health Sciences Certificate of Achievement.	N/A	Program mapping needs to be implemented to determine which courses, outcomes, and assessments should be used in compiling program learning outcome performance data.

Aggregate Sciences Program Student Learning Outcomes (PSLOs), 2015-2016 through 2018-2019

Sciences PSLOs	N	Able and Confident	Able and Somewhat Confident	Able and Not Confident	Not Able
Adequately explain thinking and mathematical processes, and justify mathematical solutions effectively and accurately.	16	68.8%	25.0%	6.3%	0.0%
Apply appropriate physical laws and mathematical techniques to analyze various physical situations.	16	62.5%	31.3%	6.3%	0.0%
Apply major theories and principles of the field to everyday life and determine the impact of these theories on the aging individual and/or society as a whole.	16	62.5%	37.5%	0.0%	0.0%
Communicate chemical concepts effectively in written and/or oral forms.	16	43.8%	25.0%	25.0%	6.3%
Design and apply the process of science to address a hypothesis.	16	81.3%	12.5%	6.3%	0.0%
Develop and exhibit high standards of professional practice, demonstrating awareness of ethical and social responsibilities in today's multicultural, team-oriented, rapidly-changing healthcare/management environment.	16	87.5%	6.3%	6.3%	0.0%
Find, select, evaluate and communicate scientific information present in primary research literature, mass media, online or other sources.	16	62.5%	37.5%	0.0%	0.0%
Identify and describe major concepts and theoretical principles as applied to physics.	16	37.5%	37.5%	12.5%	12.5%
Perform various scientific experiments and analyze data to check agreement with theoretical predictions.	16	68.8%	31.3%	0.0%	0.0%
Support opinions/ideas using solid research principles.	16	81.3%	18.8%	0.0%	0.0%

The aggregate post-graduation survey results show that the majority of graduates of the Sciences Program were able and confident or somewhat confident in demonstrating the PSLOs. Graduates indicated that their ability and confidence in supporting opinions/ideas using solid research principles was highest. In contrast, confidence and ability was lowest in communicating chemical concepts effectively in written and/or oral forms.

Curriculum Review

Curriculum Review

Course	Title	Term Reviewed	Status
BIOL C100	Introduction to Biology	Spring 2017	Effective Fall 2017
BIOL C100C	Introduction to Biology Lecture/Lab	Fall 2017	Effective Fall 2018
BIOL C100L	Introduction to Biology Lab	Spring 2017	Effective Fall 2017
BIOL C102	Intro. to the Concepts of Anatomy and Physiology	Spring 2018	Effective Fall 2018
BIOL C103	Introduction to Marine Science	Spring 2017	Effective Fall 2017
BIOL C103L	Marine Sciences Lab	Fall 2019	Effective Spring 2020
BIOL C104	Medical Terminology for Health Professionals	Spring 2017	Effective Fall 2017
BIOL C106/ ECOL C100	Human Ecology	Fall 2017	Effective Fall 2018
BIOL C109	Career Choices in Healthcare	Fall 2019	Effective Fall 2020
BIOL C120	Biology of Aging	Spring 2017	Effective Fall 2017
BIOL C122	Bioethics	Spring 2020	Effective Summer 2020
BIOL C180	Cell and Molecular Biology	Fall 2019	Effective Fall 2020
BIOL C185	Diversity of Organisms	Spring 2017	Effective Fall 2017
BIOL C200	Pharmacology	Spring 2017	Effective Fall 2017
BIOL C210	General Microbiology	Spring 2020	Effective Fall 2020
BIOL C211	General Microbiology Lecture	Spring 2020	Effective Fall 2020
BIOL C211L	General Microbiology Lab	Fall 2019	Suspended/To be reinstated Fall 2020
BIOL C220	Human Anatomy	Spring 2020	Effective Fall 2020
BIOL C221	Introduction to Anatomy and Physiology	Spring 2017	Effective Fall 2017
BIOL C225	Human Physiology	Spring 2020	Effective Summer 2020
BIOL C281	Biochemistry	Spring 2017	Effective Fall 2017
BIOL C282	Molecular Biology	Fall 2019	Suspended
BIOL C283	Genetics	Fall 2019	Spring 2020
BIOL C291	Biology Work Based Learning	Spring 2019	Effective Fall 2019
BIOL C292	Biology Work Based Learning	Spring 2019	Effective Fall 2019
BIOL C293	Work Based Learning	Fall 2019	Suspended
BIOL C296	Advanced Anatomical Dissection	Fall 2013	Currently not offered
MRSC C100	Introduction to Marine Science	Spring 2017	Effective Fall 2017
MRSC C100L	Marine Sciences Lab	Fall 2019	Effective Spring 2020
MRSC C105	Marine Biology	Fall 2019	Suspended

External Analysis: Market Assessment

Data from the Occupational Employment Statistics program and the U.S. Bureau of Labor Statistics, indicates that healthcare practitioners and healthcare support occupations are projected to show a 15% and 23% increase in employment numbers from 2016 to 2026, respectively. In addition 17 of the 30 fastest growing occupations in that time frame can be filled by students in the biological sciences. In addition, the Final Report of the California Future Wealth Workforce Commission (2019) concluded that there will be a shortage of 4100 Primary Care Clinicians and 600,000 Home Health Care Workers over the next decade.

Progress on Initiative(s)

Progress on Forward Strategies

Initiative(s)	Status	Progress Status	Outcome(s)
Create new Lab Space at Garden Grove	Not Started	delayed	Need Feasibility Study
Create a new biotechnology certificate	Not Started	Biotechnology Program Suspended	Biotechnology Courses suspended
Increase Biotechnology Equipment to strengthen the program	Not Started	Biotechnology Program Suspended	Biotechnology Courses suspended
Full time Instructional Lab Associate needed to aid in Microbiology, Anatomy, Physiology, Diversity of Organisms, General Biology, Cell and Molecular Biology, and Marine Science Labs that occur over 3 campuses	In-Progress	Awaiting funding	Unknown
Cadaver lab to increase student knowledge, provide the necessary education for the pre-health care student, and perhaps decrease some dissection costs	In-Progress	Awaiting funding	NIH SHARE Grant was not awarded. Plan to submit for Stauffer Grant this Fall.
Nursing Program; PT aid; Pharm aid/tech programs	Delayed	Low Priority	TBD
Hire 2 Full Time Faculty members – 1 for Anatomy/Physiology and 1 for Cell/Molecular Biology	In-Progress	Will request again during full-time faculty prioritization	Biology was ranked #1 and #2 during prioritization process, but was not chosen for new faculty hires.

Response to Program and Department Review Committee Recommendation(s)

Progress on Recommendations

Recommendation(s)	Status	Response Summary
Work with the Instructional Wing to identify opportunities for lab expansions for all sciences.	In-progress	No work currently being done on this. Best place for lab expansion and consolidation remains the 3 rd floor of Garden Grove
Secure a National Institute of Health (NIH) grant to support student research projects, building of Cadaver lab, and creation of summer camps.	Not addressed	Award was not granted to Coastline
Evaluate the impact of guided pathways on the Sciences Program	In-progress	Working with Pathways team to construct suggested 2 year pathway for Biology ADT.

Program Planning and Communication Strategies

The Full Time Biology faculty routinely meets at least once every semester. Department meetings are held during fall and Spring Flex Days to discuss SLOs, RSI, best practices, and training opportunities.

SLOs are currently being tracked two ways:

1. SLOs are determined through the methodology determined by the Institutional Research, Planning, Effectiveness and Grant Development and SLO coordinator
2. SLO data is tracked in the SLO Cloud for each section based on a pre-determined reporting schedule.

Coastline Pathways

The department co-chairs have been working with the Pathways team to create a suggested 2-year pathway for students looking to transfer into programs in math or the sciences or obtain an associates degree in these areas of emphasis. Recommendations have been submitted to the Pathways team.

Implications of Change

The focus of the department and program over the last year has been to increase efficiency of our offerings by adjustments to class scheduling and consolidation of course sections. In addition, we have increased enrollments by making adjustments to allow for a significant number of high school students to enroll in a handful of courses. The department is in the final stages of adding curriculum to be able to enroll students interested in the Allied Health Care Careers Certificate starting in Spring 2021 (approved for Fall 2020). Also, in order to increase flexibility in hiring of high-quality instructors to increase course offerings, the department will be proposing the introduction of a new discipline titled "Medical and Health Sciences". This discipline will encompass the pre-professional coursework for nursing, pharmacy, physical therapy, occupational therapy, physician assistant, medical, and dental schools. This will allow for hiring faculty to teach courses in the medical and health sciences, namely anatomy and physiology that possess a Master's degree in Physician Assistance or Nursing; Doctor's in Medicine, Dentistry, Physical Therapy, Occupational Therapy, Chiropractic, or Pharmacy.

Section 2: Human Capital Planning

Staffing

Year	Administrator /Management	F/T Faculty	P/T Faculty	Classified	Hourly
Previous year 2019-2020	Dean 1	F/T faculty 5	P/T faculty 22	Full Time Instructional Lab Associate-1	Up to 3 part time Lab Associates
Current year 2020-2021	Dean 1	F/T faculty 4	P/T faculty 25	Full Time Instructional Lab Associate-1	Up to 3 part time Lab Associates
1 year	Dean 1 Assistant Dean 1	F/T faculty 5	P/T faculty 26	Full Time Instructional Lab Associate-2	Up to 3 part time Lab Associates
2 years	Dean 1 Assistant Dean 1	F/T faculty 6	P/T faculty 27	Full Time Instructional Lab Associate-3	Up to 3 part time Lab Associates
3 years	Dean 1 Assistant Dean 1	F/T faculty 6	P/T faculty 28	Full Time Instructional Lab Associate-3	Up to 3 part time Lab Associates

Based on initiation of the newly developed “Medical and Health Sciences” discipline, we can enhance our faculty pool by allowing for individuals with Master’s degree in Physician Assistance or Nursing; Doctor’s in Medicine, Dentistry, Physical Therapy, Occupational Therapy, Chiropractic, or Pharmacy to be hired without the need to apply for equivalency. This is a 2-year process that requires approval at the state level.

Professional Development

Professional Development

Name (Title)	Professional Development	Outcome
Steve Fauce (F/T Faculty)	2020 SLO Symposium	Networking with other faculty and coordinators.
Debbie Henry (F/T Faculty)	Western Neurosurgical Society Annual Meeting	Update on health care
	ASCCC Leadership Conference	Update on Leadership in Academic Senates in California
	ASCCC Curriculum Institute	Update on community college curriculum in California
David Camerini (P/T Faculty)	NIH Scientific Review Group ZRG1 AARR-P (11 & 92)	AIDS Related Diagnostics to review grant applications
	Cold Spring Harbor Laboratory COVID/SARS CoV2 Rapid Research Reports conferences	Stay up to date of COVID-related scientific developments.
Tracey Magrann (P/T Faculty)	Assembly on Education	Required CEU's for Registered Health Information Administrator credential
Denny Patel (P/T Faculty)	Remote Instruction Course at Santa Ana College Online	How to improve online instruction
	Con-Ed for Professional Development	Pelvic Restoration and Cervical Revolution
Dr. Karis Wong (P/T Faculty)	Mobilization of Visceral Fascia	Beneficial for work as a Physical Therapist and a Human Anatomy instructor
	Basic Life Support for Healthcare Providers	Review of CPR and other cardiovascular life support skills for medical professionals.
	California Physical Therapy Ethics, Laws, and Regulations	Ethics training for Physical Therapy License renewal.
	Everfi Trainings: Preventing Harassment and Discrimination, Drugs and Alcohol at Work, FERPA Basics, Managing Bias	Trainings for Chapman University faculty
Benjamin Tran (P/T Faculty)	SABER West 2020	Increase interactions among STEM educators and education researchers.
Beck Wehrle (P/T Faculty)	Annual Meeting Society for Integrative and Comparative Biology	Present research, attend research and teaching talks and workshops.
Tanya Hoerer and Debbie Henry (F/T Faculty)	California Virtual Campus, Online Education Initiative	Share Showcase – Teaching Online Science Labs: Biology
Lisa Demchik (P/T Faculty)	Teaching Remotely Certificate from Cal State Fullerton Faculty Development Center	Suggestions and updates to online pedagogy for teaching remotely.

Section 3: Facilities Planning

Facility Assessment

Currently we have four biology labs across three campuses. We have two at Newport Beach Center, one at Le-Jao Center, and one at Garden Grove Center. Because the Garden Grove and Le-Jao Center only have one lab each, this makes it difficult for the science or health science student to take more than one class at one campus. This also increases the work load and cost for travel on faculty and our lone instructional lab associate. This also increases the biohazard at three campuses.

- 1.) **Garden Grove Lab Center:** Ideally, we would have an additional laboratory space at the Garden Grove campus where students could take Anatomy and Physiology classes. Having an up-to-date laboratory, with two doors for safety (as the Le-Jao lab has only one) and a prep area (as the Le-Jao has none), would alleviate some of the additional work and travel time for faculty, staff, and students. If there is enough room, additional faculty offices could be made at Garden Grove as well.

Forward Strategy

GARDEN GROVE LAB CENTER

What college goal does the Garden Grove Center Lab Center support?

- Instructional and Programmatic Excellence- Create two centers for the Health Sciences and Science majors
- Access and Student Support
- Student Retention and Persistence
- Culture of Evidence, Planning, Innovation, and Change
- Fiscal Stewardship, Scalability, and Sustainability-much easier to manage two centers than three

What Educational Master Plan objective does the Garden Grove Lab Center support? Select all that apply

- Increase student success, retention, and persistence across all instructional delivery modalities with emphasis in distance education.
- Provide universal access to student service and support programs.
- Strengthen post-Coastline outcomes (e.g., transfer to Universities and Health Care Programs).
- Explore and enter new fields of study (e.g Health Science Certificate, ADTs in the Sciences).
- Foster and sustain industry connections and expand external funding sources (e.g., STEM grants, Hoag Scholars Program) to facilitate programmatic advancement.
- Strengthen community engagement (e.g., student life, alumni relations, and academic alliances).
- Maintain the College's Asian American and Native American Pacific Islander Serving Institution (AANAPISI) designation and pursue becoming a designated Hispanic Serving Institution (HSI).

What evidence supports the labs at the Garden Grove Center? Select all that apply

- Internal Research (Student achievement, program performance)

TIMELINE: 3-5 years

- 2.) **CADAVER LAB:** Some students, as part of their application process for transfer to degree programs, require access to a human cadaver. Having a human cadaver program would enhance the Health Science students experience, meet the needs of the transfer student requirements, and may eliminate the need for the dissection of cats (which has become increasingly difficult as there is a shortage). Also, as one student put it, this is a Human Anatomy class, not a Cat Anatomy class. Attached is the proposal for building the cadaver lab. Below is the data from our most recent 5-year Program Review.

Academic Year	2013-2014					
Semester	Summer		Fall		Spring	
CourseID	Sections	Enrollment	Sections	Enrollment	Sections	Enrollment
BIOL 210	0	0	4	103	3	84
BIOL 220	2	50	7	195	6	173
BIOL 225	2	60	5	126	3	81
CHEM 110	1	62	4	137	3	135
CHEM 110L	2	63	5	136	4	135
CHEM 180	1	32	2	78	2	85
CHEM 180L	1	32	3	77	3	84
Total	9	299	30	852	24	777

Academic Year	2014-2015					
Semester	Summer		Fall		Spring	
CourseID	Sections	Enrollment	Sections	Enrollment	Sections	Enrollment
BIOL 210	0	0	3	86	3	85
BIOL 220	2	61	7	202	7	188
BIOL 225	1	33	4	99	4	113
CHEM 110	1	70	5	146	6	157
CHEM 110L	2	71	0	0	0	0
CHEM 180	1	31	2	80	2	80
CHEM 180L	1	32	3	78	3	78
Total	8	298	24	691	25	701

Academic Year	2015-2016					
Semester	Summer		Fall		Spring	
CourseID	Sections	Enrollment	Sections	Enrollment	Sections	Enrollment
BIOL 210	0	0	4	97	4	102
BIOL 220	4	103	8	220	7	191
BIOL 225	3	81	5	126	5	145
CHEM 110	3	116	5	148	6	182
CHEM 110L	0	0	0	0	0	0
CHEM 180	2	60	2	70	2	82
CHEM 180L	2	58	3	67	3	80
Total	14	418	27	728	27	782

Academic Year	2016-2017					
Semester	Summer		Fall		Spring	
CourseID	Sections	Enrollment	Sections	Enrollment	Sections	Enrollment
BIOL 210	0	0	5	135	5	130
BIOL 220	2	67	7	194	8	233
BIOL 225	2	54	5	116	5	137
CHEM 110	3	76	5	105	6	166
CHEM 110L	0	0	0	0	0	0
CHEM 180	2	59	2	59	2	58
CHEM 180L	2	53	2	56	2	52
Total	11	309	26	665	28	776

From Summer 2013 to Spring 2017, we have served **7,296** students in the Health Science Certificate courses. Of these students, **1,867** have taken Bio 220 Human Anatomy. See below for a screen shot of the enrollments for Human Anatomy of Fall 2020.

BIOL C220 - Human Anatomy																	
Status	I	Z	CRN	Cred	Meeting Time				Location	Cap	Act	WL Cap	WL Act	Instructor	Date	Weeks	
Waitlisted	71		24426	5.00	M	W			08:45am - 10:50am	Coastline LIVEONLINE	28	28	30	21	Debra Stockwell	08/24-12/12	16
					M	W			11:05am - 12:40pm	Coastline LIVEONLINE						08/24-12/12	
Waitlisted	71		24467	5.00	M	W			08:45am - 10:50am	Coastline LIVEONLINE	28	28	30	3	Sara Fanai-Khayat	08/24-12/12	16
					M	W			10:50am - 12:15pm	Coastline LIVEONLINE						08/24-12/12	
Waitlisted	71		24463	5.00	M	W			12:15pm - 02:20pm	Coastline LIVEONLINE	28	28	30	4	Tu Do	08/24-12/12	16
					M	W			02:35pm - 04:00pm	Coastline LIVEONLINE						08/24-12/12	
Waitlisted	71		24465	5.00	M	W			01:00pm - 03:05pm	Coastline LIVEONLINE	28	28	30	3	Abbey Brown	08/24-12/12	16
					M	W			03:20pm - 04:45pm	Coastline LIVEONLINE						08/24-12/12	
Waitlisted	71		24559	5.00	M	W			06:00pm - 08:05pm	Coastline LIVEONLINE	28	28	30	11	Seyed Ahmadpanah	08/24-12/12	16
					M	W			08:10pm - 09:35pm	Coastline LIVEONLINE						08/24-12/12	
Waitlisted	71		24464	5.00		T	Th		08:45am - 10:50am	Coastline LIVEONLINE	28	28	30	3	Katherine Feher	08/24-12/12	16
						T	Th		11:05am - 12:45pm	Coastline LIVEONLINE						08/24-12/12	
Waitlisted	71		24827	5.00		T	Th		08:45am - 10:45am	Coastline LIVEONLINE	28	28	30	10	Dr. Denny Patel	08/24-12/12	16
						T	Th		10:45am - 12:10pm	Coastline LIVEONLINE						08/24-12/12	
Waitlisted	71		24466	5.00		T	Th		06:00pm - 08:05pm	Coastline LIVEONLINE	28	28	30	16	Hayley Smalls	08/24-12/12	16
						T	Th		08:10pm - 09:35pm	Coastline LIVEONLINE						08/24-12/12	
Waitlisted	71		26263	5.00			S		09:00am - 11:00am	Coastline LIVEONLINE	28	28	30	11	Dr. Karis Wong	08/24-12/12	16
							S		11:00am - 12:25pm	Coastline LIVEONLINE						08/24-12/12	
							S		01:00pm - 03:00pm	Coastline LIVEONLINE						08/24-12/12	
							S		03:00pm - 04:25pm	Coastline LIVEONLINE						08/24-12/12	

Forward Strategy

CADAVER LAB

What college goal does the Cadaver Lab support?

- Student Success, Completion, and Achievement
- Instructional and Programmatic Excellence
- Access and Student Support
- Student Retention and Persistence
- Culture of Evidence, Planning, Innovation, and Change
- Partnerships and Community Engagement
- Fiscal Stewardship, Scalability, and Sustainability

What Educational Master Plan objective does the Cadaver Lab support?

- Strengthen post-Coastline outcomes (e.g., transfer into Health Care fields/schools).
- Explore and enter new fields of study (e.g., Health Care Fields).

What evidence supports this initiative? Select all that apply

- Internal Research (Student requests as a need for entry into certain Health Care schools, specifically occupational therapy; enhance onsite learning)
- Learning Outcome (SLO/PSLO) assessment

TIMELINE: Less than one year, dependent on funding.

Section 4: Technology Planning

Technology Assessment

Technology is utilized in our Cell and Molecular Biology, Diversity of Organisms, Microbiology, Physiology and Work-Study Programs. Current needs are

1. Lab laptop for Work Based Learning, and major's biology students and student advisor use. This will house the statistical program and 3D modeling programs.
2. Anatomy-based Software Package for 3D printer (may be able to use free cloud-based program)
3. Webcam/laptop and microscope camera needed for lab to support possible live virtual demonstrations due to in-person labs not being offered during COVID-19 pandemic.
4. Assessment of faculty needs for LIVEONLINE Zoom including purchase of equipment such as iPads, webcams, microphones, for enhancement of remote learning.

Forward Strategy

What college goal does Technology Planning/Equipment/Consumables/Service Contracts Planning support? Select one

- Student Success, Completion, and Achievement
- X Instructional and Programmatic Excellence
- Student Retention and Persistence
- Fiscal Stewardship, Scalability, and Sustainability

What Educational Master Plan objective does Technology Planning/Equipment/Consumables/Service Contracts Planning support? Select all that apply

- X Increase student success, retention, and persistence across all instructional delivery modalities with emphasis in distance education.
- X Strengthen post-Coastline outcomes (e.g., transfer, job placement).
- Explore and enter new fields of study (e.g., new programs, bachelor's degrees).
- Strengthen community engagement (e.g., student life, alumni relations, industry and academic alliances).

What evidence supports Technology Planning/Equipment/Consumables/Service Contracts Planning? Select all that apply

- X Internal Research (Student achievement, program performance)
- External Research (Academic literature, market assessment, audit findings, compliance mandates-See Attachment on Job Analysis)

Section 5: Ongoing/New Initiatives

Initiative #1: Creation of no cost/no credit lab skills courses and local Certificate for "Preprofessional Lab Experience Skills"

Describe how the initiative supports the college mission:

Offer students an additional no cost/no credit lab skills courses in Anatomy, Microbiology, Physiology, and Chemistry (in conjunction with the Chemistry department) to supplement the virtual labs that we will taught due to the COVID-19 pandemic. All these four courses together will make up the Certificate for "Preprofessional Lab Experience Skills".

What college goal does the initiative support?

- Reduce all student equity gaps regarding access and achievement (Equity)
- Increase student completion and achievement outcomes by 20% (Achievement)
- Strengthen College collaboration, communication, continuous learning, and community engagement (Engagement)
- Further develop, adopt, and adapt innovative practices and technologies that advance student success and institutional effectiveness (Innovation & Effectiveness)

How does this initiative play a part in Coastline Pathways?

All these four courses together will make up a Certificate of completion. Anatomy, Physiology, Chemistry and Microbiology are core courses of the Health Sciences Certificate of Achievement.

What evidence supports this initiative? Select all that apply

- Learning or Service Area Outcome (SLO/SAO) assessment
- Internal Research (Student achievement, program performance)
- External Research (Academic literature, market assessment, audit findings, compliance mandates)

Describe how the evidence supports this initiative.

With labs being held remotely due to COVID-19 for at least part of the 2020-2021 academic year, students are unable to have the same face-to-face instruction for key laboratory techniques in anatomy and microbiology.

Recommended resource(s) needed for initiative achievement:

Development of curriculum, certificate, and instructors to teach the course.

What is the anticipated outcome of completing the initiative?

Skills course to be taught during Summer 2021.

Provide a timeline and timeframe from initiative inception to completion.

Skills courses and Certificate for "Preprofessional Lab Experience Skills" will be submitted for curriculum committee approval in October 2020.

Initiative #2: Introduction of a new discipline titled “Medical and Health Sciences”.

Describe how the initiative supports the college mission:

The department will be proposing the introduction of a new discipline titled “Medical and Health Sciences”. This discipline will encompass the pre-professional coursework for nursing, pharmacy, physical therapy, occupational therapy, physician assistant, medical, and dental schools. This will allow for hiring faculty to teach courses in the medical and health sciences, namely anatomy and physiology that possess a Master’s degree in Physician Assistance or Nursing; Doctor’s in Medicine, Dentistry, Physical Therapy, Occupational Therapy, Chiropractic, or Pharmacy.

What college goal does the initiative support?

- Reduce all student equity gaps regarding access and achievement (Equity)
- Increase student completion and achievement outcomes by 20% (Achievement)
- Strengthen College collaboration, communication, continuous learning, and community engagement (Engagement)
- Further develop, adopt, and adapt innovative practices and technologies that advance student success and institutional effectiveness (Innovation & Effectiveness)

How does this initiative play a part in Coastline Pathways?

More potential offerings of core courses for Health Sciences Certificate of Achievement

What evidence supports this initiative? Select all that apply

- Learning or Service Area Outcome (SLO/SAO) assessment
- Internal Research (Student achievement, program performance)
- External Research (Academic literature, market assessment, audit findings, compliance mandates)

Describe how the evidence supports this initiative.

Many colleges have already separated their biological sciences programs into two categories to recognize the needs for our pre-professional students. Expanding the teaching pool for the medical and health sciences to include professionals with masters and professional doctorate degrees and maintaining those with masters or above in the biological sciences only serves to give our students a richer experience. All community colleges in California are constantly looking for and hiring faculty to teach courses in the medical and health sciences, namely anatomy and physiology. Under the current discipline those without specific Master’s degrees in the biological sciences must go through equivalency process to teach these biological science courses, and often this process is delayed especially in the summer when faculty are on leave.

Recommended resource(s) needed for initiative achievement:

None. Already in progress. Must be approved by Academic Senate followed by ASCCC approval.

What is the anticipated outcome of completing the initiative?

The biological sciences program will be split into two categories to recognize the needs for our pre-professional students. Upon completion, hiring for courses under the new discipline will be streamlined and more efficient.

Provide a timeline and timeframe from initiative inception to completion.

2 years.

Initiative #3: Create and support curriculum to be able to enroll students interested in the Allied Health Careers Certificate starting in Spring 2021.

Describe how the initiative supports the college mission:

In support of our military program, and the Service Employees International Union (SEIU), a new Certificate was created known as the Allied Health Careers Certificate. In order to fulfill all the requirements of the certificate, new curriculum needed to be developed as a joint venture between the biological sciences and health departments.

What college goal does the initiative support?

- Reduce all student equity gaps regarding access and achievement (Equity)
- Increase student completion and achievement outcomes by 20% (Achievement)
- Strengthen College collaboration, communication, continuous learning, and community engagement (Engagement)
- Further develop, adopt, and adapt innovative practices and technologies that advance student success and institutional effectiveness (Innovation & Effectiveness)

How does this initiative play a part in Coastline Pathways?

Creation of a new Certificate of Achievement.

What evidence supports this initiative? Select all that apply

- Learning or Service Area Outcome (SLO/SAO) assessment
- Internal Research (Student achievement, program performance)
- External Research (Academic literature, market assessment, audit findings, compliance mandates)

Describe how the evidence supports this initiative.

SEIU was in favor of a certificate that would allow students to take classes that could potentially meet prerequisites for advanced programs. In addition, they wanted classes that would potentially prepare students for careers in the fields of Medical Assistant, Imaging (ex. Rad Tech, or Sonography), LVN, Surgical Tech, Medical Coding.

Recommended resource(s) needed for initiative achievement:

Instructor to teach BIOL C109 Career Choices in Healthcare.

What is the anticipated outcome of completing the initiative?

Start offering Allied Health Careers Certificate starting in Spring 2021

Provide a timeline and timeframe from initiative inception to completion.

6 months

Initiative #4: Development of an Associates of Arts (AA) Degree for Health Sciences

Describe how the initiative supports the college mission:

Offering a newly created AA Degrees for our students will lead to an increase in degrees obtained from the department. This major is appropriate for students who plan to enter training in one of the health professions, including nursing, physical therapy, occupational therapy, dental hygiene, physician assisting, and health sciences.

What college goal does the initiative support?

- Reduce all student equity gaps regarding access and achievement (Equity)
- Increase student completion and achievement outcomes by 20% (Achievement)
- Strengthen College collaboration, communication, continuous learning, and community engagement (Engagement)
- Further develop, adopt, and adapt innovative practices and technologies that advance student success and institutional effectiveness (Innovation & Effectiveness)

How does this initiative play a part in Coastline Pathways?

This will create a new AA for students interested in the Science area of emphasis

What evidence supports this initiative? Select all that apply

- Learning or Service Area Outcome (SLO/SAO) assessment
- Internal Research (Student achievement, program performance)
- External Research (Academic literature, market assessment, audit findings, compliance mandates)

Describe how the evidence supports this initiative.

Research of offerings from local colleges (namely Irvine Valley College and Saddleback College) offer this degree.

Recommended resource(s) needed for initiative achievement:

Additional faculty to expand our course offerings

What is the anticipated outcome of completing the initiative?

Completion of this curriculum qualifies students to receive AA in Health Sciences.

Provide a timeline and timeframe from initiative inception to completion.

3-5 years.

Initiative #5: Development of an Associate's Degree for Transfer (ADT) for Environmental Studies.

Describe how the initiative supports the college mission:

Offering a newly created ADT for our students will lead to an increase in degrees obtained from the department.

What college goal does the initiative support?

- Reduce all student equity gaps regarding access and achievement (Equity)
- Increase student completion and achievement outcomes by 20% (Achievement)
- Strengthen College collaboration, communication, continuous learning, and community engagement (Engagement)
- Further develop, adopt, and adapt innovative practices and technologies that advance student success and institutional effectiveness (Innovation & Effectiveness)

How does this initiative play a part in Coastline Pathways?

This will create a new ADT for students interested in the Science area of emphasis

What evidence supports this initiative? Select all that apply

- Learning or Service Area Outcome (SLO/SAO) assessment
- Internal Research (Student achievement, program performance)
- External Research (Academic literature, market assessment, audit findings, compliance mandates)

Describe how the evidence supports this initiative.

This degree could be offered by Coastline with the introduction of a single course that is not being offered (Intro to Environmental Science). Course outline of record has been submitted to curriculum committee for review in early October 2020.

Recommended resource(s) needed for initiative achievement:

Additional faculty to expand our course offerings

What is the anticipated outcome of completing the initiative?

Completion of this curriculum qualifies students to receive ADT in Environmental Studies.

Provide a timeline and timeframe from initiative inception to completion.

To be submitted to curriculum committee for approval Fall 2020.

Section 6: Prioritization

List and prioritize initiative requests.

Initiative	Resource(s)	Est. Cost	Funding Type	Health, Safety Compliance	Evidence	College Goal	Complete By	Priority
Annual Biological Science Budget	General funds; lottery funds	75,000	General funds	No	Cannot run labs without supplies	Cannot run labs without supplies	Yearly request	1
Two Full Time Instructional Lab Associates	General funds	75,000/each	General Funds	Yes	Cannot run labs without help and safety	Cannot run labs without help and safety	2020-2021	2
Refrigerator	Equipment funds	1,500	Equipment funds	Yes	Cannot run labs without	Cannot run labs without	2020	3
Microscope Camera and laptop for Microbiology lab	General or equipment funds	2,000	General or Equipment Funds	No	Required for live demos until in-person labs are running	Transferrable research and practical skills for students	2020	4
IPads for faculty working remotely to enhance LIVE ONLINE teaching	General Funds	10,000	General Funds	No	Teaching through ConferZoom using a table allows for enhanced annotation	To assist with remote teaching in virtual classes	2021	5
Laptop for three-dimensional computer-aided design (Work Based Learning)	General or equipment funds	2,400	General or Equipment Funds	No	Cannot analyze data collected by students or support student projects in BIOL290s without	Transferrable research and practical skills for students	2020	6
Health Science Academic Triathlon	VP funds	1,000	VP funds	No	Promotes certificates	Promotes certificates	Yearly request	7
Small Open Air Platform Shaker	Equipment funds	4,000	Equipment funds	No	Required for Growth Curve Cultures in Microbiology	Transferrable research and practical skills for students	2020	8
Cadaver Lab	General funds	300,000	Stauffer Grant	No	See last program review 2017-2018	Increase certificates	2021	9
Two Full Time Faculty	General Funds	100,000/each	General Funds	No	FTES growing each semester	Increase degrees and certificates	2020	10
Conversion of 3 rd floor Garden Grove Rooms to labs	Measure M?	Needs feasibility study	?	No	See last program review 2017-2018	Increase certificates Improve Guided pathways for students	?	11



2020-21
Annual Program Review
Physical Sciences
(Astronomy, Chemistry, Geology, Physics)

Section 1: Program Planning

Internal Analysis and Program Effectiveness: Astronomy

Productivity	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Enrollment	61,279	63,824	60,164	61,368	59,444
Subject State-Funded Enrollment	892	936	932	985	1,006
State-Funded Resident FTES	6,073.30	6,343.88	5,929.28	6,189.33	6,104.88
Subject Resident FTES	80.46	86.74	84.82	90.95	92.65
Sections	8	8	10	11	11
Fill Rate	82.1%	79.4%	77.2%	80.0%	82.0%
WSCH/FTEF 595 Efficiency	1,239	1,257	1,095	1,087	1,081
FTEF/30	1.1	1.1	1.3	1.4	1.4
Extended Learning Enrollment	426	457	469	285	186

The percentage change in the number of Astronomy **enrollments** in 2018-19 showed a slight increase from 2017-18 and a substantial increase from 2014-15.

The percentage change in 2018-19 **resident FTES** in Astronomy credit courses showed a slight increase from 2017-18 and a substantial increase in comparison with resident FTES in 2014-15.

The percentage change in the number of **sections** in Astronomy courses in 2018-19 showed a minimal difference from 2017-18 and a substantial increase from the number of sections in 2014-15.

The percentage change in the **fill rate** in 2018-19 for Astronomy courses showed a slight increase from 2017-18 and a minimal difference in comparison with the fill rate in 2014-15.

The percentage change in the **WSCH/FTEF** ratio in Astronomy courses in 2018-19 showed a minimal difference from 2017-18 and a substantial decrease from 2014-15.

The percentage change in the **FTEF/30** ratio for Astronomy courses in 2018-19 showed a slight increase from 2017-18 and a substantial increase in comparison with the FTEF/30 ratio in 2014-15.

There was a substantial decrease in the number of Astronomy **Extended Learning enrollments** in 2018-19 from 2017-18 and a substantial decrease from 2014-15.

Calculation Categories

Language	Range
Minimal to No Difference	< 1.0%
Slight Increase/Decrease	Between 1.0% and 5.0%
Moderate Increase/Decrease	Between 5.1% and 10.0%
Substantial Increase/Decrease	> 10.0%

Comparison of Enrollment Trends	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Enrollment	61,279	63,824	60,164	61,368	59,444
Subject State-Funded Enrollment	892	936	932	985	1,006

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	0.0%	1.4%	5.5%	3.5%	2.9%
Online	27.7%	28.3%	32.8%	32.5%	31.5%
Hybrid	6.1%	1.1%	0.0%	0.0%	0.0%
Correspondence (Cable, Telecourse, Other DL)	66.3%	69.2%	61.7%	64.1%	65.6%

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	23.8%	21.4%	23.6%	22.6%	21.6%
Male	75.3%	77.5%	74.2%	76.8%	76.7%
Unknown	0.9%	1.2%	2.1%	0.6%	1.7%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	13.0%	10.8%	12.4%	12.3%	10.4%
American Indian/AK Native	1.7%	1.4%	1.5%	1.0%	0.8%
Asian	8.6%	10.1%	9.7%	7.5%	9.4%
Hispanic	23.4%	21.8%	25.8%	27.7%	28.5%
Pacific Islander/HI Native	0.7%	0.4%	0.4%	0.3%	0.6%
White	37.7%	36.9%	34.8%	36.4%	33.5%
Multi-Ethnicity	13.7%	17.1%	14.5%	13.4%	15.1%
Other/Unknown	1.2%	1.5%	1.0%	1.3%	1.6%

Age Group	2014-15	2015-16	2016-17	2017-18	2018-19
19 or Less	7.6%	6.1%	10.5%	7.2%	6.6%
20 to 24	19.8%	19.6%	14.5%	13.7%	14.2%
25 to 29	15.6%	16.6%	14.3%	18.4%	17.2%
30 to 34	16.4%	17.8%	17.8%	15.0%	15.9%
35 to 39	12.3%	12.6%	15.7%	15.4%	16.2%
40 to 49	18.5%	17.5%	18.3%	17.9%	18.2%
50 and Older	9.8%	9.8%	8.9%	12.4%	12.0%
Unknown	0.0%	0.0%	0.0%	0.0%	0.0%

Astronomy courses made up 1.7% of all state-funded enrollment for 2018-19. The percentage difference in Astronomy course **enrollment** in 2018-19 showed a slight increase from 2017-18 and a substantial increase from 2014-15. Enrollment in Astronomy during 2018-19 showed 2.9% of courses were taught **traditional (face-to-face)**, 31.5% were taught **online**, 0.0% were taught in the **hybrid** modality, and 65.6% were taught in the **correspondence (cable, telecourse, and other distance learning)** modality.

In 2018-19, Astronomy enrollment consisted of 21.6% **female**, 76.7% **male**, and 1.7% students of **unknown** gender. In 2018-19, Astronomy enrollment consisted of 10.4% **African American** students, 0.8% **American Indian/AK Native** students, 9.4% **Asian** students, 28.5% **Hispanic** students, 0.6% **Pacific Islander/HI Native** students, 33.5% **White** students, 15.1% **multi-ethnic** students, and 1.6% students of **other** or **unknown** ethnicity. The age breakdown for 2018-19 enrollments in Astronomy revealed 6.6% aged **19 or less**, 14.2% aged **20 to 24**, 17.2% aged **25 to 29**, 15.9% aged **30 to 34**, 16.2% aged **35 to 39**, 18.2% aged **40 to 49**, 12.0% aged **50 and older**, and 0.0% **unknown**.

Success and Retention: Astronomy

Comparison of Success Rates	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Success Rate	65.4%	66.7%	68.6%	70.9%	72.2%
College Institution Set Standard Success Rate	55.4%	55.5%	56.7%	58.3%	59.8%
Subject Success Rate	61.3%	66.1%	73.1%	74.1%	77.9%

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	-	69.2%	74.5%	73.5%	86.2%
Online	50.6%	55.7%	60.8%	56.9%	56.5%
Hybrid	44.4%	70.0%	-	-	-
Correspondence (Cable, Telecourse, Other DL)	67.3%	70.2%	79.5%	82.9%	87.9%

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	53.8%	58.0%	59.5%	61.4%	61.3%
Male	64.1%	68.4%	77.5%	77.9%	82.8%
Unknown	25.0%	63.6%	70.0%	66.7%	70.6%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	54.3%	59.4%	62.1%	57.0%	71.4%
American Indian/AK Native	73.3%	46.2%	78.6%	80.0%	75.0%
Asian	58.4%	69.5%	76.7%	75.7%	74.7%
Hispanic	62.7%	66.7%	74.6%	77.7%	82.2%
Pacific Islander/HI Native	50.0%	75.0%	75.0%	100.0%	83.3%
White	65.8%	71.3%	79.0%	79.4%	81.6%
Multi-Ethnicity	53.3%	56.0%	65.9%	67.4%	67.1%
Other/Unknown	72.7%	85.7%	22.2%	61.5%	87.5%

Age Group	2014-15	2015-16	2016-17	2018-19	2018-19
19 or Less	48.5%	63.2%	74.5%	70.4%	72.7%
20 to 24	48.6%	54.6%	61.5%	59.3%	62.1%
25 to 29	56.1%	62.3%	66.2%	74.6%	71.7%
30 to 34	72.6%	65.9%	76.5%	70.3%	82.5%
35 to 39	71.8%	68.6%	78.1%	78.9%	85.9%
40 to 49	68.5%	79.3%	82.5%	82.4%	85.8%
50 and Older	59.8%	70.7%	66.3%	78.7%	79.3%
Unknown	-	-	-	-	-

The percentage difference in the **course success rate** in Astronomy courses in 2018-19 showed a moderate increase from 2017-18 and a substantial increase from 2014-15. When comparing the percentage point difference in the Astronomy 2018-19 course success rate to the College's overall success average* (72.2%) and the institution-set standard* (59.8%) for credit course success, the Astronomy **course success rate** was moderately higher than the **college average** and substantially higher than the **institution-set standard** for credit course success.

When comparing the percentage point difference between instructional modalities to the overall Astronomy success rate for 2018-19, the success rate was a moderate increase for **traditional (face-to-face)** Astronomy courses, a substantial decrease for **online** courses, no comparative data for **hybrid**

courses, and a moderate increase for **correspondence (cable, telecourse, and other distance learning)** courses.

When comparing the percentage point difference between genders to the overall Astronomy success rate for 2018-19, the success rate was a substantial decrease for **female** students in Astronomy courses, a slight increase for **male** students, and a moderate decrease for students of **unknown** gender.

When comparing the percentage point difference between ethnicity groups to the overall Astronomy success rate for 2018-19, the success rate was a moderate decrease for **African American** students in Astronomy courses, a slight decrease for **American Indian/AK Native** students, a slight decrease for **Asian** students, a slight increase for **Hispanic** students, a moderate increase for **Pacific Islander/HI Native** students, a slight increase for **White** students, a substantial decrease for **multi-ethnic** students, and a moderate increase for students of **other** or **unknown** ethnicity.

When comparing the percentage point difference between age groups to the overall Astronomy success rate for 2018-19, the success rate was a moderate decrease for students aged **19 or less** in Astronomy courses, a substantial decrease for students aged **20 to 24**, a moderate decrease for students aged **25 to 29**, a slight increase for students aged **30 to 34**, a moderate increase for students aged **35 to 39**, a moderate increase for students aged **40 to 49**, a slight increase for students aged **50 and older**, and no comparative data for students of unknown age.

Comparison of Retention Rates	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Retention Rate	82.3%	83.4%	83.7%	85.1%	86.1%
College Institution Set Standard Retention Rate	70.1%	70.0%	70.9%	71.1%	72.3%
Subject Retention Rate	75.6%	79.3%	82.2%	81.9%	85.4%

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	-	69.2%	92.2%	79.4%	86.2%
Online	65.2%	73.1%	74.5%	66.3%	68.5%
Hybrid	64.8%	90.0%	-	-	-
Correspondence (Cable, Telecourse, Other DL)	80.9%	81.8%	85.4%	90.0%	93.5%

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	70.3%	75.5%	75.5%	69.5%	72.8%
Male	77.7%	80.2%	84.4%	85.7%	88.9%
Unknown	37.5%	81.8%	80.0%	66.7%	88.2%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	66.4%	79.2%	74.1%	70.2%	82.9%
American Indian/AK Native	80.0%	84.6%	78.6%	80.0%	75.0%
Asian	72.7%	78.9%	83.3%	83.8%	81.1%
Hispanic	79.4%	78.4%	83.3%	85.3%	90.9%
Pacific Islander/HI Native	100.0%	75.0%	100.0%	100.0%	100.0%
White	76.8%	82.3%	86.4%	84.7%	87.5%
Multi-Ethnicity	73.0%	72.3%	78.5%	76.5%	74.3%
Other/Unknown	90.9%	92.9%	44.4%	84.6%	87.5%

Age Group	2014-15	2015-16	2016-17	2018-19	2018-19
19 or Less	75.0%	77.2%	91.8%	83.1%	87.9%
20 to 24	71.2%	74.9%	73.3%	68.1%	70.0%
25 to 29	70.5%	72.1%	78.2%	81.8%	80.9%
30 to 34	80.1%	81.4%	85.5%	81.8%	91.3%
35 to 39	81.8%	83.1%	84.9%	86.8%	90.2%
40 to 49	79.4%	87.2%	84.8%	86.4%	91.8%
50 and Older	70.1%	78.3%	74.7%	84.4%	84.3%
Unknown	-	-	-	-	-

The percentage difference in the **course retention rate** in Astronomy courses in 2018-19 showed a slight increase from 2017-18 and a substantial increase from 2014-15. When comparing the percentage point difference in the Astronomy 2018-19 course retention rate to the College's overall retention average* (86.1%) and the institution-set standard* (72.3%) for credit course retention, the Astronomy **course retention rate** was minimal to no difference than the **college average** and substantially higher than the **institution-set standard** for credit course retention.

When comparing the percentage point difference between instructional modalities to the overall Astronomy retention rate for 2018-19, the retention rate was a minimal difference for **traditional (face-to-face)** Astronomy courses, a substantial decrease for **online** courses, no comparative data for **hybrid courses**, and a moderate increase for **correspondence (cable, telecourse, and other distance learning)** courses.

When comparing the percentage point difference between genders to the overall Astronomy retention rate for 2018-19, the retention rate was a substantial decrease for **female** students in Astronomy courses, a slight increase for **male** students, and a slight increase for students of **unknown** gender.

When comparing the percentage point difference between ethnicity groups to the overall Astronomy retention rate for 2018-19, the retention rate was a slight decrease for **African American** students in Astronomy courses, a substantial decrease for **American Indian/AK Native** students, a slight decrease for **Asian** students, a moderate increase for **Hispanic** students, a substantial increase for **Pacific Islander/HI Native** students, a slight increase for **White** students, a substantial decrease for **multi-ethnic** students, and a slight increase for students of **other** or **unknown** ethnicity.

When comparing the percentage point difference between age groups to the overall Astronomy retention rate for 2018-19, the retention rate was a slight increase for students aged **19 or less** in Astronomy courses, a substantial decrease for students aged **20 to 24**, a slight decrease for students aged **25 to 29**, a moderate increase for students aged **30 to 34**, a slight increase for students aged **35 to 39**, a moderate increase for students aged **40 to 49**, a slight decrease for students aged **50 and older**, and no comparative data for students of **unknown** age.

Internal Analysis and Program Effectiveness: Chemistry

Productivity	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Enrollment	61,279	63,824	60,164	61,368	59,444
Subject State-Funded Enrollment	1,344	1,480	1,229	1,253	1,291
State-Funded Resident FTES	6,073.30	6,343.88	5,929.28	6,189.33	6,104.88
Subject Resident FTES	208.74	235.86	190.83	198.34	203.89
Sections	53	55	51	57	57
Fill Rate	86.7%	86.8%	86.8%	79.2%	80.5%
WSCH/FTEF 595 Efficiency	480	492	431	390	407
FTEF/30	7.4	8.3	7.7	8.6	8.4
Extended Learning Enrollment	113	86	88	78	75

The percentage change in the number of Chemistry **enrollments** in 2018-19 showed a slight increase from 2017-18 and a slight decrease from 2014-15.

The percentage change in 2018-19 **resident FTES** in Chemistry credit courses showed a slight increase from 2017-18 and a slight decrease in comparison with resident FTES in 2014-15.

The percentage change in the number of **sections** in Chemistry courses in 2018-19 showed a minimal difference from 2017-18 and a moderate increase from the number of sections in 2014-15.

The percentage change in the **fill rate** in 2018-19 for Chemistry courses showed a slight increase from 2017-18 and a moderate decrease in comparison with the fill rate in 2014-15.

The percentage change in the **WSCH/FTEF** ratio in Chemistry courses in 2018-19 showed a slight increase from 2017-18 and a substantial decrease from 2014-15.

The percentage change in the **FTEF/30** ratio for Chemistry courses in 2018-19 showed a slight decrease from 2017-18 and a substantial increase in comparison with the FTEF/30 ratio in 2014-15.

There was a slight decrease in the number of Chemistry **Extended Learning enrollments** in 2018-19 from 2017-18 and a substantial decrease from 2014-15.

Calculation Categories

Language	Range
Minimal to No Difference	< 1.0%
Slight Increase/Decrease	Between 1.0% and 5.0%
Moderate Increase/Decrease	Between 5.1% and 10.0%
Substantial Increase/Decrease	> 10.0%

Comparison of Enrollment Trends	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Enrollment	61,279	63,824	60,164	61,368	59,444
Subject State-Funded Enrollment	1,344	1,480	1,229	1,253	1,291

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	67.3%	65.3%	66.2%	66.6%	62.2%
Online	21.1%	21.3%	24.5%	23.7%	27.7%
Hybrid	8.6%	13.4%	9.4%	9.7%	10.1%
Correspondence (Cable, Telecourse, Other DL)	3.1%	0.0%	0.0%	0.0%	0.0%

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	60.3%	59.1%	59.4%	61.1%	67.7%
Male	38.0%	39.7%	39.7%	37.7%	30.9%
Unknown	1.7%	1.2%	0.9%	1.2%	1.4%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	2.8%	2.0%	1.8%	1.5%	1.5%
American Indian/AK Native	0.0%	0.2%	0.0%	0.0%	0.2%
Asian	45.0%	48.2%	47.6%	47.5%	45.9%
Hispanic	9.7%	9.3%	10.0%	12.1%	14.3%
Pacific Islander/HI Native	0.1%	0.1%	0.4%	0.2%	0.2%
White	29.5%	27.6%	26.4%	22.7%	23.1%
Multi-Ethnicity	11.8%	10.9%	13.0%	14.7%	14.4%
Other/Unknown	1.1%	1.7%	0.8%	1.2%	0.4%

Age Group	2014-15	2015-16	2016-17	2017-18	2018-19
19 or Less	14.3%	13.6%	14.1%	13.1%	14.1%
20 to 24	40.6%	42.4%	39.8%	42.5%	43.9%
25 to 29	22.2%	23.2%	27.1%	27.9%	27.9%
30 to 34	12.0%	10.4%	11.6%	9.2%	7.4%
35 to 39	5.3%	5.3%	2.0%	2.7%	3.6%
40 to 49	3.6%	3.0%	3.7%	3.8%	3.3%
50 and Older	2.0%	2.1%	1.7%	0.9%	1.2%
Unknown	0.0%	0.0%	0.0%	0.0%	0.0%

Chemistry courses made up 2.2% of all state-funded enrollment for 2018-19. The percentage difference in Chemistry course **enrollment** in 2018-19 showed a slight increase from 2017-18 and a slight decrease from 2014-15. Enrollment in Chemistry during 2018-19 showed 62.2% of courses were taught **traditional (face-to-face)**, 27.7% were taught **online**, 10.1% were taught in the **hybrid** modality, and 0.0% were taught in the **correspondence (cable, telecourse, and other distance learning)** modality.

In 2018-19, Chemistry enrollment consisted of 67.7% **female**, 30.9% **male**, and 1.4% students of **unknown** gender. In 2018-19, Chemistry enrollment consisted of 1.5% **African American** students, 0.2% **American Indian/AK Native** students, 45.9% **Asian** students, 14.3% **Hispanic** students, 0.2% **Pacific Islander/HI Native** students, 23.1% **White** students, 14.4% **multi-ethnic** students, and 0.4% students of **other** or **unknown** ethnicity. The age breakdown for 2018-19 enrollments in Chemistry revealed 14.1% aged **19 or less**, 43.9% aged **20 to 24**, 27.9% aged **25 to 29**, 7.4% aged **30 to 34**, 3.6% aged **35 to 39**, 3.3% aged **40 to 49**, 1.2% aged **50 and older**, and 0.0% **unknown**.

Success and Retention: Chemistry

Comparison of Success Rates	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Success Rate	65.4%	66.7%	68.6%	70.9%	72.2%
College Institution Set Standard Success Rate	55.4%	55.5%	56.7%	58.3%	59.8%
Subject Success Rate	82.3%	78.5%	80.3%	80.6%	75.3%

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	83.2%	79.5%	78.8%	80.8%	76.1%
Online	80.9%	75.6%	82.7%	78.0%	70.9%
Hybrid	78.3%	78.4%	84.3%	86.0%	83.1%
Correspondence (Cable, Telecourse, Other DL)	-	-	-	-	-

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	80.5%	77.6%	80.7%	80.2%	75.9%
Male	84.7%	80.7%	79.7%	81.4%	73.4%
Unknown	86.4%	50.0%	81.8%	80.0%	88.9%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	75.0%	69.0%	72.7%	84.2%	52.6%
American Indian/AK Native	-	66.7%	-	-	100.0%
Asian	85.1%	81.0%	83.6%	83.0%	82.1%
Hispanic	67.2%	71.0%	73.2%	80.3%	66.5%
Pacific Islander/HI Native	100.0%	100.0%	60.0%	66.7%	66.7%
White	83.4%	79.5%	80.2%	78.5%	76.2%
Multi-Ethnicity	81.1%	72.7%	75.0%	76.4%	62.9%
Other/Unknown	92.9%	84.0%	90.0%	80.0%	100.0%

Age Group	2014-15	2015-16	2016-17	2018-19	2018-19
19 or Less	82.1%	78.1%	82.1%	78.7%	75.8%
20 to 24	83.9%	78.8%	76.5%	81.5%	75.4%
25 to 29	78.5%	75.2%	86.2%	82.5%	74.7%
30 to 34	84.2%	79.9%	78.3%	79.1%	76.0%
35 to 39	86.4%	86.1%	60.0%	73.5%	76.1%
40 to 49	73.9%	81.8%	84.4%	74.5%	78.6%
50 and Older	84.0%	80.6%	90.5%	72.7%	66.7%
Unknown	-	-	-	-	-

The percentage difference in the **course success rate** in Chemistry courses in 2018-19 showed a moderate decrease from 2017-18 and a moderate decrease from 2014-15. When comparing the percentage point difference in the Chemistry 2018-19 course success rate to the College's overall success average* (72.2%) and the institution-set standard* (59.8%) for credit course success, the Chemistry **course success rate** was slightly higher than the **college average** and substantially higher than the **institution-set standard** for credit course success.

When comparing the percentage point difference between instructional modalities to the overall Chemistry success rate for 2018-19, the success rate was a minimal difference for **traditional (face-to-**

face) Chemistry courses, a slight decrease for **online** courses, a moderate increase for **hybrid courses**, and no comparative data for **correspondence (cable, telecourse, and other distance learning)** courses.

When comparing the percentage point difference between genders to the overall Chemistry success rate for 2018-19, the success rate was a minimal difference for **female** students in Chemistry courses, a slight decrease for **male** students, and a substantial increase for students of **unknown** gender.

When comparing the percentage point difference between ethnicity groups to the overall Chemistry success rate for 2018-19, the success rate was a substantial decrease for **African American** students in Chemistry courses, a substantial increase for **American Indian/AK Native** students, a moderate increase for **Asian** students, a moderate decrease for **Hispanic** students, a moderate decrease for **Pacific Islander/HI Native** students, a minimal difference for **White** students, a substantial decrease for **multi-ethnic** students, and a substantial increase for students of **other** or **unknown** ethnicity.

When comparing the percentage point difference between age groups to the overall Chemistry success rate for 2018-19, the success rate was a minimal difference for students aged **19 or less** in Chemistry courses, a minimal difference for students aged **20 to 24**, a minimal difference for students aged **25 to 29**, a minimal difference for students aged **30 to 34**, a minimal difference for students aged **35 to 39**, a slight increase for students aged **40 to 49**, a moderate decrease for students aged **50 and older**, and no comparative data for students of unknown age.

Comparison of Retention Rates	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Retention Rate	82.3%	83.4%	83.7%	85.1%	86.1%
College Institution Set Standard Retention Rate	70.1%	70.0%	70.9%	71.1%	72.3%
Subject Retention Rate	89.3%	86.7%	87.7%	87.6%	84.0%

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	88.4%	86.9%	85.7%	86.7%	82.8%
Online	90.5%	86.3%	92.0%	89.2%	84.4%
Hybrid	93.0%	86.4%	90.4%	90.1%	90.8%
Correspondence (Cable, Telecourse, Other DL)	-	-	-	-	-

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	87.5%	85.4%	87.3%	88.5%	84.3%
Male	91.6%	89.4%	88.3%	86.3%	83.0%
Unknown	95.5%	61.1%	90.9%	86.7%	94.4%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	91.7%	89.7%	86.4%	89.5%	73.7%
American Indian/AK Native	-	66.7%	-	-	100.0%
Asian	89.9%	87.4%	89.6%	88.6%	87.3%
Hispanic	85.7%	85.5%	87.8%	90.1%	75.7%
Pacific Islander/HI Native	100.0%	100.0%	60.0%	100.0%	66.7%
White	89.3%	86.6%	86.1%	86.6%	86.6%
Multi-Ethnicity	87.8%	85.1%	84.4%	84.1%	78.5%
Other/Unknown	100.0%	84.0%	100.0%	80.0%	100.0%

Age Group	2014-15	2015-16	2016-17	2018-19	2018-19
19 or Less	93.5%	92.0%	91.9%	86.6%	89.6%
20 to 24	89.8%	87.4%	85.9%	89.6%	83.6%
25 to 29	85.1%	80.8%	90.4%	88.5%	81.9%
30 to 34	90.1%	85.1%	85.3%	81.7%	82.3%
35 to 39	90.9%	91.1%	60.0%	82.4%	84.8%
40 to 49	80.4%	90.9%	91.1%	80.9%	83.3%
50 and Older	100.0%	93.5%	95.2%	81.8%	93.3%
Unknown	-	-	-	-	-

The percentage difference in the **course retention rate** in Chemistry courses in 2018-19 showed a slight decrease from 2017-18 and a moderate decrease from 2014-15. When comparing the percentage point difference in the Chemistry 2018-19 course retention rate to the College's overall retention average* (86.1%) and the institution-set standard* (72.3%) for credit course retention, the Chemistry **course retention rate** was slightly lower than the **college average** and substantially higher than the **institution-set standard** for credit course retention.

When comparing the percentage point difference between instructional modalities to the overall Chemistry retention rate for 2018-19, the retention rate was a slight decrease for **traditional (face-to-face)** Chemistry courses, a minimal difference for **online** courses, a moderate increase for **hybrid courses**, and no comparative data for **correspondence (cable, telecourse, and other distance learning)** courses.

When comparing the percentage point difference between genders to the overall Chemistry retention rate for 2018-19, the retention rate was a minimal difference for **female** students in Chemistry courses, a slight decrease for **male** students, and a substantial increase for students of **unknown** gender.

When comparing the percentage point difference between ethnicity groups to the overall Chemistry retention rate for 2018-19, the retention rate was a substantial decrease for **African American** students in Chemistry courses, a substantial increase for **American Indian/AK Native** students, a slight increase for **Asian** students, a moderate decrease for **Hispanic** students, a substantial decrease for **Pacific Islander/HI Native** students, a slight increase for **White** students, a moderate decrease for **multi-ethnic** students, and a substantial increase for students of **other** or **unknown** ethnicity.

When comparing the percentage point difference between age groups to the overall Chemistry retention rate for 2018-19, the retention rate was a moderate increase for students aged **19 or less** in Chemistry courses, a minimal difference for students aged **20 to 24**, a slight decrease for students aged **25 to 29**, a slight decrease for students aged **30 to 34**, a minimal difference for students aged **35 to 39**, a minimal difference for students aged **40 to 49**, a moderate increase for students aged **50 and older**, and no comparative data for students of **unknown** age.

Internal Analysis and Program Effectiveness: Geology

Productivity	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Enrollment	61,279	63,824	60,164	61,368	59,444
Subject State-Funded Enrollment	1,431	1,473	1,470	1,334	1,313
State-Funded Resident FTES	6,073.30	6,343.88	5,929.28	6,189.33	6,104.88
Subject Resident FTES	132.60	135.93	134.42	122.46	120.95
Sections	27	32	32	27	28
Fill Rate	75.0%	66.5%	69.3%	64.4%	69.9%
WSCH/FTEF 595 Efficiency	850	739	718	709	697
FTEF/30	2.6	3.1	3.2	2.9	2.9
Extended Learning Enrollment	285	274	286	182	139

The percentage change in the number of Geology **enrollments** in 2018-19 showed a slight decrease from 2017-18 and a moderate decrease from 2014-15.

The percentage change in 2018-19 **resident FTES** in Geology credit courses showed a slight decrease from 2017-18 and a moderate decrease in comparison with resident FTES in 2014-15.

The percentage change in the number of **sections** in Geology courses in 2018-19 showed a slight increase from 2017-18 and a slight increase from the number of sections in 2014-15.

The percentage change in the **fill rate** in 2018-19 for Geology courses showed a moderate increase from 2017-18 and a moderate decrease in comparison with the fill rate in 2014-15.

The percentage change in the **WSCH/FTEF** ratio in Geology courses in 2018-19 showed a slight decrease from 2017-18 and a substantial decrease from 2014-15.

The percentage change in the **FTEF/30** ratio for Geology courses in 2018-19 showed a minimal difference from 2017-18 and a substantial increase in comparison with the FTEF/30 ratio in 2014-15.

There was a substantial decrease in the number of Geology **Extended Learning enrollments** in 2018-19 from 2017-18 and a substantial decrease from 2014-15.

Calculation Categories

Language	Range
Minimal to No Difference	< 1.0%
Slight Increase/Decrease	Between 1.0% and 5.0%
Moderate Increase/Decrease	Between 5.1% and 10.0%
Substantial Increase/Decrease	> 10.0%

Comparison of Enrollment Trends	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Enrollment	61,279	63,824	60,164	61,368	59,444
Subject State-Funded Enrollment	1,431	1,473	1,470	1,334	1,313

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	0.0%	1.1%	1.4%	0.0%	0.0%
Online	59.3%	61.7%	62.8%	57.2%	58.9%
Hybrid	2.3%	2.7%	4.3%	6.1%	5.4%
Correspondence (Cable, Telecourse, Other DL)	38.4%	34.5%	31.6%	36.7%	35.7%

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	36.7%	43.4%	41.9%	39.5%	39.1%
Male	62.1%	55.1%	56.2%	58.8%	59.6%
Unknown	1.2%	1.6%	1.9%	1.7%	1.2%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	9.7%	10.5%	11.5%	8.8%	9.1%
American Indian/AK Native	0.7%	1.2%	0.7%	1.0%	1.2%
Asian	13.3%	11.7%	11.6%	12.8%	13.6%
Hispanic	18.4%	19.0%	20.0%	18.2%	20.3%
Pacific Islander/HI Native	0.5%	0.6%	0.5%	0.3%	0.2%
White	40.5%	40.5%	37.6%	42.4%	37.5%
Multi-Ethnicity	14.7%	15.2%	16.6%	15.1%	16.2%
Other/Unknown	2.1%	1.4%	1.5%	1.3%	1.8%

Age Group	2014-15	2015-16	2016-17	2017-18	2018-19
19 or Less	8.6%	9.7%	10.8%	8.9%	10.4%
20 to 24	25.2%	27.9%	29.9%	28.3%	27.9%
25 to 29	18.5%	15.5%	14.3%	16.7%	18.6%
30 to 34	14.3%	13.8%	12.9%	12.9%	11.8%
35 to 39	11.0%	10.0%	11.0%	9.7%	8.5%
40 to 49	13.8%	16.0%	11.8%	13.9%	12.2%
50 and Older	8.6%	7.2%	9.4%	9.6%	10.2%
Unknown	0.0%	0.0%	0.0%	0.0%	0.0%

Geology courses made up 2.2% of all state-funded enrollment for 2018-19. The percentage difference in Geology course **enrollment** in 2018-19 showed a slight decrease from 2017-18 and a moderate decrease from 2014-15. Enrollment in Geology during 2018-19 showed 0.0% of courses were taught **traditional (face-to-face)**, 58.9% were taught **online**, 5.4% were taught in the **hybrid** modality, and 35.7% were taught in the **correspondence (cable, telecourse, and other distance learning)** modality.

In 2018-19, Geology enrollment consisted of 39.1% **female**, 59.6% **male**, and 1.2% students of **unknown** gender. In 2018-19, Geology enrollment consisted of 9.1% **African American** students, 1.2% **American Indian/AK Native** students, 13.6% **Asian** students, 20.3% **Hispanic** students, 0.2% **Pacific Islander/HI Native** students, 37.5% **White** students, 16.2% **multi-ethnic** students, and 1.8% students of **other** or **unknown** ethnicity. The age breakdown for 2018-19 enrollments in Geology revealed 10.4% aged **19 or less**, 27.9% aged **20 to 24**, 18.6% aged **25 to 29**, 11.8% aged **30 to 34**, 8.5% aged **35 to 39**, 12.2% aged **40 to 49**, 10.2% aged **50 and older**, and 0.0% **unknown**.

Success and Retention: Geology

Comparison of Success Rates	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Success Rate	65.4%	66.7%	68.6%	70.9%	72.2%
College Institution Set Standard Success Rate	55.4%	55.5%	56.7%	58.3%	59.8%
Subject Success Rate	70.8%	68.6%	73.6%	75.7%	80.1%

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	-	68.8%	75.0%	-	-
Online	69.7%	73.3%	79.1%	80.6%	80.5%
Hybrid	66.7%	92.5%	74.6%	86.6%	94.4%
Correspondence (Cable, Telecourse, Other DL)	72.9%	58.5%	62.5%	66.2%	77.4%

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	71.4%	74.6%	78.2%	80.1%	80.9%
Male	70.4%	63.6%	70.8%	72.8%	79.3%
Unknown	76.5%	81.8%	53.6%	73.9%	93.8%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	48.9%	52.3%	65.1%	62.7%	66.4%
American Indian/AK Native	40.0%	66.7%	70.0%	78.6%	62.5%
Asian	78.4%	77.3%	78.9%	85.4%	87.2%
Hispanic	73.5%	58.4%	65.0%	65.0%	77.2%
Pacific Islander/HI Native	57.1%	66.7%	85.7%	50.0%	0.0%
White	73.1%	74.1%	79.7%	79.3%	83.5%
Multi-Ethnicity	71.9%	71.9%	73.8%	79.1%	79.8%
Other/Unknown	63.3%	65.0%	54.5%	66.7%	83.3%

Age Group	2014-15	2015-16	2016-17	2018-19	2018-19
19 or Less	71.5%	81.1%	84.3%	84.9%	88.2%
20 to 24	72.2%	69.3%	78.4%	80.9%	80.9%
25 to 29	68.9%	62.4%	71.8%	72.2%	74.2%
30 to 34	70.6%	66.0%	65.3%	68.6%	81.3%
35 to 39	70.9%	59.2%	70.8%	72.9%	78.6%
40 to 49	72.7%	72.8%	72.3%	69.4%	78.1%
50 and Older	67.5%	71.7%	65.2%	79.7%	82.8%
Unknown	-	-	-	-	-

The percentage difference in the **course success rate** in Geology courses in 2018-19 showed a moderate increase from 2017-18 and a substantial increase from 2014-15. When comparing the percentage point difference in the Geology 2018-19 course success rate to the College's overall success average* (72.2%) and the institution-set standard* (59.8%) for credit course success, the Geology **course success rate** was moderately higher than the **college average** and substantially higher than the **institution-set standard** for credit course success.

When comparing the percentage point difference between instructional modalities to the overall Geology success rate for 2018-19, the success rate was no comparative data for **traditional (face-to-face)** Geology

courses, a minimal difference for **online** courses, a substantial increase for **hybrid courses**, and a slight decrease for **correspondence (cable, telecourse, and other distance learning)** courses.

When comparing the percentage point difference between genders to the overall Geology success rate for 2018-19, the success rate was a minimal difference for **female** students in Geology courses, a minimal difference for **male** students, and a substantial increase for students of **unknown** gender.

When comparing the percentage point difference between ethnicity groups to the overall Geology success rate for 2018-19, the success rate was a substantial decrease for **African American** students in Geology courses, a substantial decrease for **American Indian/AK Native** students, a moderate increase for **Asian** students, a slight decrease for **Hispanic** students, a substantial decrease for **Pacific Islander/HI Native** students, a slight increase for **White** students, a minimal difference for **multi-ethnic** students, and a slight increase for students of **other** or **unknown** ethnicity.

When comparing the percentage point difference between age groups to the overall Geology success rate for 2018-19, the success rate was a moderate increase for students aged **19 or less** in Geology courses, a minimal difference for students aged **20 to 24**, a moderate decrease for students aged **25 to 29**, a slight increase for students aged **30 to 34**, a slight decrease for students aged **35 to 39**, a slight decrease for students aged **40 to 49**, a slight increase for students aged **50 and older**, and no comparative data for students of unknown age.

Comparison of Retention Rates	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Retention Rate	82.3%	83.4%	83.7%	85.1%	86.1%
College Institution Set Standard Retention Rate	70.1%	70.0%	70.9%	71.1%	72.3%
Subject Retention Rate	86.9%	84.2%	86.5%	89.3%	90.4%

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	-	75.0%	90.0%	-	-
Online	84.9%	83.2%	88.0%	91.5%	87.8%
Hybrid	81.8%	97.5%	81.0%	89.0%	97.2%
Correspondence (Cable, Telecourse, Other DL)	90.2%	85.2%	84.3%	86.1%	93.6%

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	86.9%	84.5%	87.3%	90.3%	87.5%
Male	86.9%	83.7%	85.7%	88.5%	92.2%
Unknown	82.4%	90.9%	92.9%	95.7%	93.8%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	77.7%	85.0%	88.8%	89.0%	84.9%
American Indian/AK Native	100.0%	83.3%	100.0%	92.9%	87.5%
Asian	84.7%	87.2%	87.1%	91.2%	91.6%
Hispanic	90.5%	76.3%	85.4%	86.8%	89.9%
Pacific Islander/HI Native	71.4%	100.0%	100.0%	50.0%	66.7%
White	89.1%	87.7%	88.2%	89.9%	91.7%
Multi-Ethnicity	84.8%	81.0%	82.8%	90.5%	90.6%
Other/Unknown	80.0%	85.0%	68.2%	83.3%	91.7%

Age Group	2014-15	2015-16	2016-17	2018-19	2018-19
19 or Less	83.7%	88.8%	93.7%	91.6%	94.1%
20 to 24	85.3%	80.8%	86.3%	93.4%	89.2%
25 to 29	88.6%	81.0%	88.0%	90.1%	86.1%
30 to 34	87.7%	84.7%	83.2%	82.6%	90.3%
35 to 39	87.3%	84.4%	87.6%	89.1%	93.8%
40 to 49	87.9%	86.8%	86.7%	86.6%	91.9%
50 and Older	87.0%	90.6%	79.7%	87.5%	93.3%
Unknown	-	-	-	-	-

The percentage difference in the **course retention rate** in Geology courses in 2018-19 showed a slight increase from 2017-18 and a slight increase from 2014-15. When comparing the percentage point difference in the Geology 2018-19 course retention rate to the College's overall retention average* (86.1%) and the institution-set standard* (72.3%) for credit course retention, the Geology **course retention rate** was slightly higher than the **college average** and substantially higher than the **institution-set standard** for credit course retention.

When comparing the percentage point difference between instructional modalities to the overall Geology retention rate for 2018-19, the retention rate was no comparative data for **traditional (face-to-face)** Geology courses, a slight decrease for **online** courses, a moderate increase for **hybrid courses**, and a slight increase for **correspondence (cable, telecourse, and other distance learning)** courses.

When comparing the percentage point difference between genders to the overall Geology retention rate for 2018-19, the retention rate was a slight decrease for **female** students in Geology courses, a slight increase for **male** students, and a slight increase for students of **unknown** gender.

When comparing the percentage point difference between ethnicity groups to the overall Geology retention rate for 2018-19, the retention rate was a moderate decrease for **African American** students in Geology courses, a slight decrease for **American Indian/AK Native** students, a slight increase for **Asian** students, a minimal difference for **Hispanic** students, a substantial decrease for **Pacific Islander/HI Native** students, a slight increase for **White** students, a minimal difference for **multi-ethnic** students, and a slight increase for students of **other** or **unknown** ethnicity.

When comparing the percentage point difference between age groups to the overall Geology retention rate for 2018-19, the retention rate was a slight increase for students aged **19 or less** in Geology courses, a slight decrease for students aged **20 to 24**, a slight decrease for students aged **25 to 29**, a minimal difference for students aged **30 to 34**, a slight increase for students aged **35 to 39**, a slight increase for students aged **40 to 49**, a slight increase for students aged **50 and older**, and no comparative data for students of **unknown** age.

Internal Analysis and Program Effectiveness: Physics

Productivity	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Enrollment	61,279	63,824	60,164	61,368	59,444
Subject State-Funded Enrollment	341	376	375	368	400
State-Funded Resident FTES	6,073.30	6,343.88	5,929.28	6,189.33	6,104.88
Subject Resident FTES	33.13	37.77	37.73	41.78	46.12
Sections	7	8	8	10	13
Fill Rate	74.5%	76.4%	76.4%	61.7%	63.1%
WSCH/FTEF 595 Efficiency	466	452	448	547	494
FTEF/30	1.2	1.4	1.4	1.3	1.7
Extended Learning Enrollment	72	71	69	47	26

The percentage change in the number of Physics **enrollments** in 2018-19 showed a moderate increase from 2017-18 and a substantial increase from 2014-15.

The percentage change in 2018-19 **resident FTES** in Physics credit courses showed a substantial increase from 2017-18 and a substantial increase in comparison with resident FTES in 2014-15.

The percentage change in the number of **sections** in Physics courses in 2018-19 showed a substantial increase from 2017-18 and a substantial increase from the number of sections in 2014-15.

The percentage change in the **fill rate** in 2018-19 for Physics courses showed a slight increase from 2017-18 and a substantial decrease in comparison with the fill rate in 2014-15.

The percentage change in the **WSCH/FTEF** ratio in Physics courses in 2018-19 showed a moderate decrease from 2017-18 and a moderate increase from 2014-15.

The percentage change in the **FTEF/30** ratio for Physics courses in 2018-19 showed a substantial increase from 2017-18 and a substantial increase in comparison with the FTEF/30 ratio in 2014-15.

There was a substantial decrease in the number of Physics **Extended Learning enrollments** in 2018-19 from 2017-18 and a substantial decrease from 2014-15.

Calculation Categories

Language	Range
Minimal to No Difference	< 1.0%
Slight Increase/Decrease	Between 1.0% and 5.0%
Moderate Increase/Decrease	Between 5.1% and 10.0%
Substantial Increase/Decrease	> 10.0%

Comparison of Enrollment Trends	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Enrollment	61,279	63,824	60,164	61,368	59,444
Subject State-Funded Enrollment	341	376	375	368	400

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	0.0%	2.7%	2.9%	0.0%	0.0%
Online	72.4%	70.5%	71.2%	69.8%	65.3%
Hybrid	27.6%	26.9%	25.9%	30.2%	34.8%
Correspondence (Cable, Telecourse, Other DL)	0.0%	0.0%	0.0%	0.0%	0.0%

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	54.0%	55.6%	53.6%	57.3%	59.8%
Male	43.7%	42.3%	45.1%	40.2%	38.8%
Unknown	2.3%	2.1%	1.3%	2.4%	1.5%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	2.1%	2.7%	1.6%	2.4%	3.5%
American Indian/AK Native	0.0%	0.3%	0.3%	0.3%	0.3%
Asian	37.5%	37.5%	37.6%	37.0%	29.8%
Hispanic	11.1%	10.4%	10.9%	11.4%	11.3%
Pacific Islander/HI Native	0.0%	1.1%	0.0%	1.1%	0.5%
White	33.4%	32.4%	34.1%	29.9%	37.3%
Multi-Ethnicity	14.7%	13.6%	15.2%	17.4%	16.0%
Other/Unknown	1.2%	2.1%	0.3%	0.5%	1.5%

Age Group	2014-15	2015-16	2016-17	2017-18	2018-19
19 or Less	10.9%	8.5%	16.8%	12.0%	12.5%
20 to 24	45.5%	46.3%	35.5%	39.9%	40.2%
25 to 29	19.6%	22.3%	22.7%	24.7%	24.5%
30 to 34	10.6%	9.0%	9.6%	10.1%	11.3%
35 to 39	5.3%	5.9%	3.7%	5.2%	6.0%
40 to 49	4.4%	4.5%	6.1%	4.9%	6.3%
50 and Older	3.8%	3.5%	5.6%	3.3%	2.5%
Unknown	0.0%	0.0%	0.0%	0.0%	0.0%

Physics courses made up 0.7% of all state-funded enrollment for 2018-19. The percentage difference in Physics course **enrollment** in 2018-19 showed a moderate increase from 2017-18 and a substantial increase from 2014-15. Enrollment in Physics during 2018-19 showed 0.0% of courses were taught **traditional (face-to-face)**, 65.3% were taught **online**, 34.8% were taught in the **hybrid** modality, and 0.0% were taught in the **correspondence (cable, telecourse, and other distance learning)** modality.

In 2018-19, Physics enrollment consisted of 59.8% **female**, 38.8% **male**, and 1.5% students of **unknown** gender. In 2018-19, Physics enrollment consisted of 3.5% **African American** students, 0.3% **American Indian/AK Native** students, 29.8% **Asian** students, 11.3% **Hispanic** students, 0.5% **Pacific Islander/HI Native** students, 37.3% **White** students, 16.0% **multi-ethnic** students, and 1.5% students of **other** or **unknown** ethnicity. The age breakdown for 2018-19 enrollments in Physics revealed 12.5% aged **19 or less**, 40.2% aged **20 to 24**, 24.5% aged **25 to 29**, 11.3% aged **30 to 34**, 6.0% aged **35 to 39**, 6.3% aged **40 to 49**, 2.5% aged **50 and older**, and 0.0% **unknown**.

Success and Retention: Physics

Comparison of Success Rates	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Success Rate	65.4%	66.7%	68.6%	70.9%	72.2%
College Institution Set Standard Success Rate	55.4%	55.5%	56.7%	58.3%	59.8%
Subject Success Rate	75.4%	81.4%	78.9%	82.1%	86.5%

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	-	70.0%	81.8%	-	-
Online	74.1%	81.1%	76.4%	79.0%	85.1%
Hybrid	78.7%	83.2%	85.6%	89.2%	89.2%
Correspondence (Cable, Telecourse, Other DL)	-	-	-	-	-

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	79.3%	81.3%	81.6%	86.3%	88.7%
Male	69.8%	81.1%	75.7%	75.7%	83.2%
Unknown	87.5%	87.5%	80.0%	88.9%	83.3%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	85.7%	50.0%	50.0%	77.8%	85.7%
American Indian/AK Native	-	100.0%	100.0%	0.0%	100.0%
Asian	76.6%	85.8%	83.7%	92.6%	95.0%
Hispanic	71.1%	69.2%	70.7%	71.4%	75.6%
Pacific Islander/HI Native	-	50.0%	-	75.0%	100.0%
White	78.1%	83.6%	81.3%	75.5%	87.2%
Multi-Ethnicity	68.0%	78.4%	70.2%	81.3%	78.1%
Other/Unknown	75.0%	100.0%	100.0%	50.0%	66.7%

Age Group	2014-15	2015-16	2016-17	2018-19	2018-19
19 or Less	73.0%	84.4%	74.6%	75.0%	88.0%
20 to 24	70.3%	83.3%	83.5%	86.4%	85.1%
25 to 29	80.6%	81.0%	84.7%	85.7%	88.8%
30 to 34	91.7%	79.4%	80.6%	78.4%	86.7%
35 to 39	83.3%	81.8%	78.6%	89.5%	83.3%
40 to 49	66.7%	64.7%	73.9%	50.0%	96.0%
50 and Older	69.2%	76.9%	42.9%	75.0%	60.0%
Unknown	-	-	-	-	-

The percentage difference in the **course success rate** in Physics courses in 2018-19 showed a moderate increase from 2017-18 and a substantial increase from 2014-15. When comparing the percentage point difference in the Physics 2018-19 course success rate to the College's overall success average* (72.2%) and the institution-set standard* (59.8%) for credit course success, the Physics **course success rate** was substantially higher than the **college average** and substantially higher than the **institution-set standard** for credit course success.

When comparing the percentage point difference between instructional modalities to the overall Physics success rate for 2018-19, the success rate was no comparative data for **traditional (face-to-face)** Physics

courses, a slight decrease for **online** courses, a slight increase for **hybrid courses**, and no comparative data for **correspondence (cable, telecourse, and other distance learning)** courses.

When comparing the percentage point difference between genders to the overall Physics success rate for 2018-19, the success rate was a slight increase for **female** students in Physics courses, a slight decrease for **male** students, and a slight decrease for students of **unknown** gender.

When comparing the percentage point difference between ethnicity groups to the overall Physics success rate for 2018-19, the success rate was a minimal difference for **African American** students in Physics courses, a substantial increase for **American Indian/AK Native** students, a moderate increase for **Asian** students, a substantial decrease for **Hispanic** students, a substantial increase for **Pacific Islander/HI Native** students, a minimal difference for **White** students, a moderate decrease for **multi-ethnic** students, and a substantial decrease for students of **other** or **unknown** ethnicity.

When comparing the percentage point difference between age groups to the overall Physics success rate for 2018-19, the success rate was a slight increase for students aged **19 or less** in Physics courses, a slight decrease for students aged **20 to 24**, a slight increase for students aged **25 to 29**, a minimal difference for students aged **30 to 34**, a slight decrease for students aged **35 to 39**, a moderate increase for students aged **40 to 49**, a substantial decrease for students aged **50 and older**, and no comparative data for students of unknown age.

Comparison of Retention Rates	2014-15	2015-16	2016-17	2017-18	2018-19
State-Funded Retention Rate	82.3%	83.4%	83.7%	85.1%	86.1%
College Institution Set Standard Retention Rate	70.1%	70.0%	70.9%	71.1%	72.3%
Subject Retention Rate	88.6%	89.6%	88.0%	89.7%	90.5%

Modality	2014-15	2015-16	2016-17	2017-18	2018-19
Traditional	-	70.0%	100.0%	-	-
Online	90.3%	90.9%	87.3%	89.1%	90.0%
Hybrid	84.0%	88.1%	88.7%	91.0%	91.4%
Correspondence (Cable, Telecourse, Other DL)	-	-	-	-	-

Gender	2014-15	2015-16	2016-17	2017-18	2018-19
Female	91.3%	88.0%	87.6%	91.9%	91.6%
Male	85.2%	91.8%	88.8%	86.5%	89.0%
Unknown	87.5%	87.5%	80.0%	88.9%	83.3%

Ethnicity	2014-15	2015-16	2016-17	2017-18	2018-19
African American	100.0%	80.0%	100.0%	100.0%	85.7%
American Indian/AK Native	-	100.0%	100.0%	100.0%	100.0%
Asian	87.5%	90.8%	89.4%	94.9%	97.5%
Hispanic	89.5%	84.6%	92.7%	85.7%	84.4%
Pacific Islander/HI Native	-	75.0%	-	100.0%	100.0%
White	89.5%	90.2%	89.1%	84.5%	91.3%
Multi-Ethnicity	86.0%	90.2%	77.2%	89.1%	82.8%
Other/Unknown	100.0%	100.0%	100.0%	50.0%	66.7%

Age Group	2014-15	2015-16	2016-17	2018-19	2018-19
19 or Less	83.8%	90.6%	87.3%	88.6%	94.0%
20 to 24	86.5%	90.2%	90.2%	92.5%	89.2%
25 to 29	92.5%	91.7%	88.2%	89.0%	89.8%
30 to 34	97.2%	82.4%	88.9%	86.5%	91.1%
35 to 39	94.4%	90.9%	85.7%	94.7%	95.8%
40 to 49	80.0%	82.4%	91.3%	77.8%	100.0%
50 and Older	84.6%	92.3%	71.4%	83.3%	60.0%
Unknown	-	-	-	-	-

The percentage difference in the **course retention rate** in Physics courses in 2018-19 showed a minimal difference from 2017-18 and a slight increase from 2014-15. When comparing the percentage point difference in the Physics 2018-19 course retention rate to the College's overall retention average* (86.1%) and the institution-set standard* (72.3%) for credit course retention, the Physics **course retention rate** was slightly higher than the **college average** and substantially higher than the **institution-set standard** for credit course retention.

When comparing the percentage point difference between instructional modalities to the overall Physics retention rate for 2018-19, the retention rate was no comparative data for **traditional (face-to-face)** Physics courses, a minimal difference for **online** courses, a minimal difference for **hybrid courses**, and no comparative data for **correspondence (cable, telecourse, and other distance learning)** courses.

When comparing the percentage point difference between genders to the overall Physics retention rate for 2018-19, the retention rate was a slight increase for **female** students in Physics courses, a slight decrease for **male** students, and a moderate decrease for students of **unknown** gender.

When comparing the percentage point difference between ethnicity groups to the overall Physics retention rate for 2018-19, the retention rate was a slight decrease for **African American** students in Physics courses, a moderate increase for **American Indian/AK Native** students, a moderate increase for **Asian** students, a moderate decrease for **Hispanic** students, a moderate increase for **Pacific Islander/HI Native** students, a minimal difference for **White** students, a moderate decrease for **multi-ethnic** students, and a substantial decrease for students of **other** or **unknown** ethnicity.

When comparing the percentage point difference between age groups to the overall Physics retention rate for 2018-19, the retention rate was a slight increase for students aged **19 or less** in Physics courses, a slight decrease for students aged **20 to 24**, a minimal difference for students aged **25 to 29**, a minimal difference for students aged **30 to 34**, a moderate increase for students aged **35 to 39**, a moderate increase for students aged **40 to 49**, a substantial decrease for students aged **50 and older**, and no comparative data for students of **unknown** age.

Program Awards

Awards	2014-15	2015-16	2016-17	2017-18	2018-19
Degrees (Coastline Total)	1,609	1,893	2,074	2,025	2,188
Subject Degrees Awarded	0	0	0	0	1
Certificates (Coastline Total)	692	600	602	628	709
Subject Certificates Awarded	0	0	0	0	0

The percentage change in the number of Physics degrees awarded in 2018-19 showed no comparative data from 2017-18 and no comparative data from the number of degrees awarded in 2014-15.

The percentage change in the number of Physics certificates awarded in 2018-19 showed no comparative data from 2017-18 and showed no comparative data in comparison with the number of certificates awarded in 2014-15.

Equity

Astronomy: No statistically significant trends were observed during this period. The relative percentage of females has remained steady at about 20-25%, which is consistent with national averages and the relative percentage of women who major in STEM fields. The success rate for females improved significantly since 2014, however it still lags behind the success rate for males. This may be due to the higher overall success rates for the male dominated Telecourse offerings.

Chemistry: No statistically significant trends were observed during this period. The relative percentage of female students taking Chemistry (65%) is much higher than for most STEM fields. This may be related to the CHEM requirement for nursing programs, which tend to have a higher percentage of females.

Geology: No statistically significant trends were observed during this period.

Physics: No statistically significant trends were observed during this period. The relative percentage of female students taking Physics (60%) is much higher than for most STEM fields. This may be related to the PHYS 120/125 requirement for PA programs, which tend to have a higher percentage of females.

Achievement

Astronomy: No statistically significant trends were observed during this period.

Chemistry: No statistically significant trends were observed during this period.

Geology: No statistically significant trends were observed during this period.

Physics: No statistically significant trends were observed during this period.

Program Efficiency

Astronomy: No statistically significant trends were observed during this period.

Chemistry: No statistically significant trends were observed during this period.

Geology: No statistically significant trends were observed during this period.

Physics: No statistically significant trends were observed during this period.

Student (SLOs) and Program Student Learning Outcomes (PSLOs)

The There were no issues with the Physical Sciences SLOs except in Chemistry, which showed a rate of roughly 50% for meeting the CSLOs 6-8. This may be due to under-reporting, as we are still working on having all SLOs linked in Canvas for some of our courses.

Aggregate Sciences Program Student Learning Outcomes (PSLOs), 2015-2016 through 2018-2019

Sciences PSLOs	N	Able and Confident	Able and Somewhat Confident	Able and Not Confident	Not Able
Adequately explain thinking and mathematical processes, and justify mathematical solutions effectively and accurately.	16	68.8%	25.0%	6.3%	0.0%
Apply appropriate physical laws and mathematical techniques to analyze various physical situations.	16	62.5%	31.3%	6.3%	0.0%
Apply major theories and principles of the field to everyday life and determine the impact of these theories on the aging individual and/or society as a whole.	16	62.5%	37.5%	0.0%	0.0%
Communicate chemical concepts effectively in written and/or oral forms.	16	43.8%	25.0%	25.0%	6.3%
Design and apply the process of science to address a hypothesis.	16	81.3%	12.5%	6.3%	0.0%
Develop and exhibit high standards of professional practice, demonstrating awareness of ethical and social responsibilities in today's multicultural, team-oriented, rapidly-changing healthcare/management environment.	16	87.5%	6.3%	6.3%	0.0%
Find, select, evaluate and communicate scientific information present in primary research literature, mass media, online or other sources.	16	62.5%	37.5%	0.0%	0.0%
Identify and describe major concepts and theoretical principles as applied to physics.	16	37.5%	37.5%	12.5%	12.5%
Perform various scientific experiments and analyze data to check agreement with theoretical predictions.	16	68.8%	31.3%	0.0%	0.0%
Support opinions/ideas using solid research principles.	16	81.3%	18.8%	0.0%	0.0%

The aggregate post-graduation survey results show that the majority of graduates of the Sciences Program were able and confident or somewhat confident in demonstrating the PSLOs. Graduates indicated that their ability and confidence in supporting opinions/ideas using solid research principles was highest. In contrast, confidence and ability was lowest in communicating chemical concepts effectively in written and/or oral forms.

Curriculum Review

No recent course revisions in the Physical Sciences except for emergency changes in DL offerings for Chemistry and Physics due to Covid.

Curriculum Review

Course	Title	Term Reviewed	Status
ASTR C100	Introduction to Astronomy		
ASTR C100L	Astronomy Laboratory		
ASTR C102	Stellar Astronomy		
ASTR C103	Cosmology		
ASTR C100	Introduction to Astronomy		
ASTR C100L	Astronomy Laboratory		
ASTR C101	Planetary Astronomy		
ASTR C102	Stellar Astronomy		
ASTR C103	Cosmology		
ASTR C104	Tools of Astronomy		
CHEM C100	Principles of Chemistry		
CHEM C105	Chemistry Explorations for Teachers		
CHEM C110	Introduction to Chemistry		
CHEM C130	Preparation for General Chemistry		
CHEM C140	Survey of Chemistry and Physics		
CHEM C180	General Chemistry A		
CHEM C180L	General Chemistry A Lab		
CHEM C185	General Chemistry B		
CHEM C185L	General Chemistry B Lab		
CHEM C220	Organic Chemistry A		
CHEM C220L	Organic Chemistry A Lab		
CHEM C225	Organic Chemistry B		
CHEM C225L	Organic Chemistry B Lab		
ECOL C100	Human Ecology		
GEOL C105	General Geology		
GEOL C105L	Geology Lab		
GEOL C106	Earth Sciences for Teachers		
GEOL C115	California Geology		
GEOL C121	Environmental Geology		
GEOL C185	Historical Geology		
GEOL C185L	Historical Geology Lab		
PHYS C110	Conceptual Physics		
PHYS C110L	Conceptual Physics Lab		
PHYS C120	Algebra Based Physics: Mechanics		
PHYS C125	Algebra Based Physics: Electricity and Magnetism		
PHYS C185	Calculus Based Physics: Mechanics		
PHYS C280	Calculus Based Physics: Electricity and Magnetism		
PHYS C285	Calculus Based Physics: Modern		
PHYS C110	Conceptual Physics	SP 19	FA 19
PHYS C110L	Conceptual Physics Lab	SP 19	FA 19
PHYS C120	Algebra Based Physics: Mechanics		
PHYS C125	Algebra Based Physics: Elec/Mag		
PHYS C140	Survey of Chemistry and Physics		
PHYS C185	Calculus Based Physics: Mechanics		
PHYS C280	Calculus Based Physics: Electricity and Magnetism		

Course	Title	Term Reviewed	Status
PHYS C285	Calculus Based Physics: Modern		

Progress on Initiative(s)

Progress on Forward Strategies

Initiative(s)	Status	Progress Status	Outcome(s)
Provide more physics offerings to meet student demand.	Ongoing	Hired two new adjuncts.	Evening section of Phys 120 added in SP 19.
Continue to provide an effective and safe learning environment by maintaining new equipment, supplies, and labs in physical sciences.	Completed/ Ongoing	In 2017-18, physical science was purchased and hired lab associates	Overall lab quality has improved
Develop and scale an Applied Physics/ Engineering program	On Hold	Waiting for clear initiative from administration	
Develop and scale a Geology Program.	On Hold	New Hire (Kelly Ruppert) in FA 2019.	
Increase course quality and student access to course materials in physical sciences	Ongoing	Early stages of PT Evals to check for rigor and accessibility.	
Full Time Faculty	Ongoing	Still need 1 FT Physics.	1 new FT GEOL (Kelly Ruppert) hired FA 19.

Response to Program and Department Review Committee Recommendation(s)

Progress on Recommendations

Recommendation(s)	Status	Response Summary
Work with the Instructional Wing to identify opportunities for lab expansions for all sciences.	Awaiting administrative approval	No work currently being done on this. Best place for lab expansion and consolidation remains the 3 rd floor of Garden Grove
Secure a National Science Foundation (NSF) grant to support student research projects.	Ongoing	STEM Grant was declined in 2018 (Tanya Murray PI, Devine was a Co-I)
Evaluate the impact of guided pathways on the Sciences Program	ongoing	Chemistry is working to develop an ADT and update any C-ID required by other programs.

Program Planning and Communication Strategies

Chair Devine created a new “course” in Canvas for the Physical Sciences Department in SP 20 to coordinate changes related to Covid and to serve as a depository for department content.

Chair Devine is scheduling and hosting Zoom Department meetings roughly once every 3-4 weeks.

Coastline Pathways

Work is continuing on a Chemistry ADT and a Geology ADT.

Implications of Change

Covid has had a significant impact on the Physical Sciences, especially Chemistry. A summary of the required changes is given below. The section on Chemistry is lengthy, and will hopefully give the committee a feeling for the amount of work involved in making the transition from F2F to remote. Once F2F classes resume, a selection of these changes will be integrated into the courses where appropriate.

Astronomy: Devine converted all labs to remote. He worked with Roy Heffelman in IT to enable remote access to the computers in NBC 117 so that students could run the suite of observing simulations to take the place of the hands-on telescope labs that are an integral part of the onsite course.

Chemistry: The FT Lab Associate Dr. Crystin Alden worked closely with the Chemistry instructors, especially Dr. Jean Dupon, to create a suite of remote labs for all Chemistry courses that are normally taught onsite. This was a tremendous challenge, as can be seen in the following descriptions:

The materials that were created for each Chemistry course running Spring of 2020:

- For Chemistry 110 Introduction to Chemistry
 - 7 on-campus labs were missed due to the pandemic shut down (not including 1 dry worksheet lab that was done via Zoom as normal). One lab had no online substitution due to the nature of the lab. It requires students to smell different compounds they have synthesized to determine which ester was created, this cannot be done by video, pictures, or simulation program.
 - Power point presentations of 4 different labs were created and included data presented in photos for analytical calculations, which then students presented in a lab write up as they would for the on-campus labs.
 - 5 simulations from Labster were chosen to help reinforce topics from the on-campus labs as well as increase the rigor of the class back to on-campus standards.
- For Chemistry 130 Preparation for Gen Chemistry
 - 5 on-campus labs were missed due to the pandemic shut down. This is not including 2 dry worksheet labs that were done via Zoom as normal, however these labs require the use of modeling kits which are provided in the lab, as such due to the pandemic instructors and students had to get creative by finding household materials that could

function as modeling kits, such as molecular modelling kits comprised of toothpicks and gummy bears to represent molecular shapes.

- Power point presentations of 4 different labs were created and included data presented in photos for analytical calculations.
- Videos of 2 separate labs being performed were recorded so students could see lab technique, make observations of chemical reactions in real time and record data. Then students either use the data to make calculations or determine an unknown as they would for the on-campus labs.
- For Chemistry 180 General Chemistry A
 - 6 on-campus labs were missed due to the pandemic shut down. This is not including 2 dry worksheet labs that were done via Zoom as normal. One Dry worksheet lab requires the use of modeling kits which are provided in the lab, as instructors and students had to get creative (as in Chem 130). However, the other dry worksheet lab requires a hydrogen discharge lamp and students need to make visual observations and measurements. This experience cannot be replicated at home and the alternate method used 2 video presentations to simulate the light refraction.
 - Power point presentations of 3 different labs were created and included data presented in photos for analytical calculations.
 - 5 videos of labs being performed were recorded so students could see lab technique, make observations of chemical reactions in real time and record data.
 - 1 simulation from an outside source was blended into the current OER lab manual so that students could interactively obtain the concepts and techniques of the original lab online at home.
- For Chemistry 185 General Chemistry B
 - 7 on-campus labs were missed due to the pandemic shut down.
 - Power point presentations of 3 different labs were created and included data presented in photos for analytical calculations, which then students presented in a lab write up as they would for the on-campus labs.
 - Videos of 2 separate labs being performed were recorded so students could see lab technique, make observations of chemical reactions in real time and record data.
- For Chemistry 220 Organic Chemistry A
 - 4 on-campus two-day labs were missed due to the pandemic shut down. This is not including 4 dry worksheet labs that were done via Zoom as normal. However, the students missed valuable experience using the gas chromatography and infrared spectroscopy determination and analysis.
 - Power point presentations of 3 different labs were created and included data presented in photos for analytical calculations, which then students presented in a lab write up as they would for the on-campus labs.

The materials that were created for each Chemistry course running Summer of 2020 until present:

- For Chemistry 110 Introduction to Chemistry
 - The major issue for this class was the need for General Chemistry, Organic Chemistry, and Biochemistry content to be combined into one class. There are limited resources

that provide all three subjects in the same manner that we were teaching in our on-campus course. To achieve this, we created our own blended course selecting a few key labs from a lab-kit (costing \$130, down from \$250) that provides the student with specialized glassware, an electronic balance, and specific chemicals in safe containers (all not readily available over the counter) for the Biochemistry and some General chemistry portions. Creating labs from household materials and some items out of the lab kit helped to fill in the General Chemistry curriculum. Then simulations and worksheets helped to fill in the Organic Chemistry sections.

- The on-campus OER Lab manual was reformed to reflect these new online labs. The project was completed in 4 weeks, before summer term began. All new online labs were also beta tested and recorded demonstrations were made before the manual was released to the students.
- The new OER online manual includes 18 labs. Blending virtual labs (Labster and other sources), work sheets, lab-kit labs, and creating labs from student provided materials.
- This manual provides one cohesive place students can access all procedures no matter the platform from which the experiment came from. Allowing students to focus on the course material while using a wide variety of content that is not found in one place.
- We also got the Bookstore to list the electronic copy of lecture book (From \$260 to \$75). We were very focused on the cost of the course.
- In the future we would like to look into an OER book for this course, however the resources currently are not out there and with only two fulltime faculty there is limited resources here as well.
- For Chemistry 130 Preparation for Gen Chemistry
 - All labs were transitioned to virtual, video, or work sheet labs.
 - Labster simulations are being used for this course.
 - It was decided that this is not a terminal course and students will gain lab skills in our Gen Chem A course. So, we are focusing on students learning the concepts and calculations.
- For Chemistry 180 General Chemistry A
 - A prepackaged lab-kit was chosen for this class to minimize the cost to the students (cost \$95). This kit includes materials for 7 labs. 5 more simulation labs are added to meet COR requirements. Each lab activity is accompanied by in-depth post-lab analytical questions and calculations.
 - A supplemental handout was written for one lab-kit lab (Gas Laws) because it did not meet the standards of our normal course work. Procedures were written up to show students how to use the lab-kit items to improve their lab experience.
 - OER for both the lecture (<https://openstax.org/books/chemistry-2e/pages/1-introduction>) and an online lab manual created by the instructor.
 - An on-campus OER lab manual was created and was being used by one instructor in Spring 2020 in the hopes that it would be adopted by other instructors in the future. However, all plans for this were halted in March with the shut down and shift to online courses. This work will continue once work stabilizes and class move back on-campus.
- For Chemistry 185 General Chemistry B

- A prepackaged lab-kit was chosen unfortunately this lab-kit is costly \$300. In this class students have to learn numerous techniques which makes the lab equipment more complex and specialized and chemicals more expensive.
- Pre-pandemic we were working on an OER lab manual, materials are gathered, however in March all plans for this were halted. This work will continue once work stabilizes and class move back on-campus.
- For Chemistry 220 Organic Chemistry A
 - Class was originally planned for Fall 2020 to run at half capacity. Multiple plans were made 1) run the class following CDC guidelines if allowed by the district, 2) run the class starting online for x- amount of weeks then move to on-campus following CDC guidelines if allowed by the district, 3) run online.
 - Coordinating this class online is not ideal as students need to learn many techniques as well as learn to use instrumentation. Currently there is no lab-kit that provides organic labs as it is extremely dangerous to have these types of chemicals at home and important to run these types of reactions in a ventilation hood.
 - OER Lecture material is used for this class:
[https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Map%3A_Organic_Chemistry_\(Wade\)](https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Map%3A_Organic_Chemistry_(Wade)).
 - To operate remotely, an entirely new lab manual was created containing 17 Labs, 8 of which are 2-day labs.
 - Approximately 3 videos, along with numerous photos of the lab being performed by the instructor is added to each lab in the new lab manual to simulate lab procedures and results that the students then use for analytical calculations and present in a lab write up as they would for the on-campus labs.
 - Moleview and Chemtube3D, two online molecular visualization programs have also been incorporated in to the new online manual due to the inaccessibility of students being able to use the molecular modeling kits in the lab. Saving students \$20- \$100.

Geology: FT GEOL instructor Kelly Ruppert had to modify Geology 105 Early College High School (ECHS) class, which is usually F2F.

Physics: Dr. Devine worked with PT Dr. Derek Bryant and Diego Gutierrez to create remote labs based on PhET simulations.

Section 2: Human Capital Planning

Staffing

Staffing Plan

Year	Administrator /Management	F/T Faculty	P/T Faculty	Classified	Hourly
Previous year		4	14	1	
Current year		4	14	1	
1 year		4	14	1	
2 years		5*	14	1**	1**
3 years		5*	14	1**	1**

* One FT PHYS is still needed, although budget constraints make it unlikely to be filled for at least 2-3 years.

** One FT Classified Lab Associate for Chemistry (Dr. Crystin Alden). Dr. Devine has filled the majority of this role for Physics out of necessity due to the difficulty in retaining/rehiring PT Lab Associates.

Professional Development

Professional Development

Name (Title)	Professional Development	Outcome
Kelly Ruppert	Ran workshops at Cal State Fullerton on Teaching Remotely Using Canvas - Beginner Level and Teaching Remotely Using Canvas - Intermediate Level. Each workshop lasted five days with 35-50 faculty participants each.	Completed in Summer 2020. Here is a portion one review provided by an attendee: "Thank you so much for sharing both your wisdom and enthusiasm for education. I left the class not only well-grounded in the use of Canvas but also carrying a new set of organization tools to help me better structure my class. Thank you Kelly! You are a true leader for our college and inspiration to your students."

Section 3: Facilities Planning

Facility Assessment

A dedicated Physics laboratory room will be needed within the next 5-10 years. The "Dance Studio" will suffice, but only as a temporary solution.

Section 4: Technology Planning

Technology Assessment

It depends on the duration of Covid and the eventual hire of a FT Physics faculty. The department will need to solve the issue of lab kits for Chemistry and how to provide the essential hands-on lab experience that is an integral part of Chemistry. A new physics hire

would be expected to explore applied physics/engineering program such as robotics

Section 5: Ongoing/New Initiatives

Initiative 1: Continue to provide an effective and safe learning environment by maintaining new equipment, supplies, and labs in physical sciences.

- Jean Dupon is continuing work on new lab manuals for Chemistry.
- David Devine is continuing work on updating the Physics lab content.
- Chemistry and Physics are working on developing Master Courses.
- Kelly Ruppert is working on developing new lab manuals for Geology.

Describe how the initiative supports the college mission:

- This initiative is directly related to student success and the creation of innovative, student-centered labs and courses.

What college goal does the initiative support?

- Reduce all student equity gaps regarding access and achievement (Equity)
- Increase student completion and achievement outcomes by 20% (Achievement)
- Strengthen College collaboration, communication, continuous learning, and community engagement (Engagement)
- Further develop, adopt, and adapt innovative practices and technologies that advance student success and institutional effectiveness (Innovation & Effectiveness)

How does this initiative play a part in Coastline Pathways?

Any program, certificate or degree that requires courses in the Physical Sciences will benefit.

What evidence supports this initiative? Select all that apply

- Learning or Service Area Outcome (SLO/SAO) assessment
- Internal Research (Student achievement, program performance)
- External Research (Academic literature, market assessment, audit findings, compliance mandates)

Describe how the evidence supports this initiative.

- Discussions with the NBC Dean, FT and PT faculty, Lab Associates and a comparison with curriculum at local community colleges has revealed a need to improve the quality and quantity of the physical sciences labs.

Recommended resource(s) needed for initiative achievement:

- No immediate resources are required, although the identification of necessary lab equipment and supplies, especially in Chemistry, will most likely arise during the next 1-2 years.

What is the anticipated outcome of completing the initiative?

- Improvements to the quality and quantity of Physical Sciences Labs and the development of Field Trips associated with Geology.

Provide a timeline and timeframe from initiative inception to completion.

- Contingent upon Covid, all updates and upgrades should be completed by the 2022-2023 school year.

Initiative 2: Develop and scale an Applied Physics/Engineering program

Describe how the initiative supports the college mission:

Provide an explanation of how the initiative supports the College mission.

- This initiative is directly related to student success and the creation of innovative, student-centered labs and courses. It will also enhance career opportunities and successful transfer to four-year colleges and universities.

What college goal does the initiative support? Select one

- Reduce all student equity gaps regarding access and achievement (Equity)
- Increase student completion and achievement outcomes by 20% (Achievement)
- Strengthen College collaboration, communication, continuous learning, and community engagement (Engagement)
- Further develop, adopt, and adapt innovative practices and technologies that advance student success and institutional effectiveness (Innovation & Effectiveness)

What evidence supports this initiative? Select all that apply

- Learning Outcome (SLO/PSLO) assessment
- Internal Research (Student achievement, program performance)
- External Research (Academic literature, market assessment, audit findings, compliance mandates)

Describe how the evidence supports this initiative.

Provide a summary of how the evidence supports the initiative.

- STEM education is a long standing point of national emphasis. One of the primary goals for the Newport Beach Center was to serve as a STEAM center. The addition of curriculum that focuses on projects related to Applied Physics/Engineering is crucial towards achieving this goal.

Recommended resource(s) needed for initiative achievement:

FT Faculty and equipment

What is the anticipated outcome of completing the initiative?

Specify the anticipated result(s) of completing the initiative.

- The establishment of NBC as a bona fide STEAM center. This will grow and enhance all STEM fields at Coastline.

Provide a timeline and timeframe from initiative inception to completion.

- 4-6 years after a new FT Physics faculty is hired.

Initiative 3: Increase course quality and student access to course materials in physical sciences

Describe how the initiative supports the college mission:

Provide an explanation of how the initiative supports the College mission.

- This initiative is directly related to student success and the creation of innovative, student-centered labs and courses. It will also enhance career opportunities and successful transfer to four-year colleges and universities.

What college goal does the initiative support? Select one

- Reduce all student equity gaps regarding access and achievement (Equity)
- Increase student completion and achievement outcomes by 20% (Achievement)
- Strengthen College collaboration, communication, continuous learning, and community engagement (Engagement)
- Further develop, adopt, and adapt innovative practices and technologies that advance student success and institutional effectiveness (Innovation & Effectiveness)

What evidence supports this initiative? Select all that apply

- Learning Outcome (SLO/PSLO) assessment
- Internal Research (Student achievement, program performance)
- X External Research (Academic literature, market assessment, audit findings, compliance mandates)

Describe how the evidence supports this initiative.

Provide a summary of how the evidence supports the initiative.

- Courses in the physical sciences are taken to satisfy GE requirements or as part of STEM majors.

Recommended resource(s) needed for initiative achievement:

- OER, Master courses

What is the anticipated outcome of completing the initiative?

Specify the anticipated result(s) of completing the initiative.

- A consistent, high quality suite of courses that ensure an appropriate level of rigor while maintaining RSI standards.

Provide a timeline and timeframe from initiative inception to completion.

- By the end of the 2022-2023 school year

Section 6: Prioritization

Kelly Ruppert, the new FT GEOL, was hired beginning FA 19.

The remaining primary need for the Physical Sciences at this time is a FT Physics faculty. Given the extremely low probability of this request being granted over the next 1-2 years due to budget constraints, Chair Devine will not be presenting a request for a FT Physics faculty at this time.

List and prioritize initiative requests.

Initiative	Resource(s)	Est. Cost	Funding Type	Health, Safety Compliance	Evidence	College Goal	Complete By	Priority
Increase course quality and student access to course materials in physical sciences	Non-Instructional Assignments	3,500	One-Time	No	Internal Research	Innovation & Effectiveness	2021-22	
Develop and scale an Applied Physics/Engineering program	STEAM center		Ongoing	No	Internal Research, External research	Equity; Achievement; Engagement; Innovation & Effectiveness	2022-23	
Continue to provide an effective and safe learning environment by maintaining new equipment, supplies, and labs in physical sciences.	Chemistry lab supplies		Ongoing	No	Internal Research	Achievement; Innovation & Effectiveness	2021-22	

Prioritization Glossary

Initiative: Provide a short description of the plan

Resource(s): Describe the resource(s) needed to support the completion of the initiative

Est. Cost: Estimated financial cost of the resource(s)

Funding Type: Specify if the resource request is one-time or ongoing

Health, Safety Compliance: Specify if the request relates to health or safety compliance issue(s)

Evidence: Specify what data type(s) supported the initiative (Internal research, external research, or learning outcomes)

College Goal: Specify what College goal the initiative aligns with

Complete By: Specify year of anticipated completion

Priority: Specify a numerical rank to the initiative

Data Glossary

Enrolled (Census): The official enrollment count based on attendance at the census point of the course.

FTES: Total full-time equivalent students (FTES) based on enrollment of resident and non-resident students. Calculations based on census enrollment or number of hours attended based on the type of Attendance Accounting Method assigned to a section.

FTEF30: A measure of productivity that measures the number of **full-time faculty** loaded for the entire year at 30 Lecture Hour Equivalents (15 LHEs per fall and spring terms). This measure provides an estimate of full-time positions required to teach the instruction load for the subject for the academic year.

WSCH/FTEF (595): A measure of productivity that measures the weekly student contact hours compared to full-time equivalent faculty. When calculated for a 16 week schedule, the productivity benchmark is 595. When calculated for an 18-week schedule, the benchmark is 525.

Success Rate: The number of passing grades (A, B, C, P) compared to all valid grades awarded.

Retention Rate: The number of retention grades (A, B, C, P, D, F, NP, I*) compared to all valid grades awarded.

Fall-to-Spring Persistence: The number of students who completed the course in the fall term and re-enrolled (persisted) in the same subject the subsequent spring semester.

F2S Percent: The number of students who completed a course in the fall term and re-enrolled in the same subject the subsequent spring semester divided by the total number of students enrolled in the fall in the subject.