SKYLINE CPR Report

SKY PR Group - Computer Science/Engineering/Electronics Technology

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Program Information

Assessment Unit Information

Program Type
Instructional
Division
Science, Technology, Engineering and Math (STEM)
Assessment Contact
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Comprehensive Program Review
2022 - 2023
Program Review Update
Fall 2025,Fall 2027

SKY Instructional Comprehensive Program Review

2022 - 2023

Instructional Comprehensive Program Review

Submitter Name:
Nicholas Langhoff

BACKGROUND

1.A. DIVISION:
Science, Technology, Engineering, and Mathematics (STEM)
PROGRAM NAME:
Engineering and Computer Science
1.C. PROGRAM REVIEW TEAM
Ariel Katz (Faculty CS), Nick Langhoff (Faculty Engr), Sumithira Sukumar (Faculty ENGR), Brooks McCall (Faculty ENGR), Deepak Tiwari (Faculty CS), Andrea Fuentes (Instructional Designer / CPR support), Michael Cross (CPR Support)
1.D. CONNECTIONS TO THE COLLEGE MISSION/VISION/VALUES:
i. Describe the program, its purpose, and how it contributes to Skyline College's Mission, "To empower and transform a global community of learners."
Skyline College's Engineering and Computer Science programs are transfer programs that offer the lower-division courses needed by students to transfer to four-year computer science programs or engineering programs in any field of engineering. The mission of the two programs is to educate students from a diverse population to become productive members of the engineering/computer science professions and society at large. Each department combines excellence in teaching theoretical principles and concepts with practical hands-on experience and the development of technical proficiency and communications skills. The departments work closely with the College's Mathematics, Physics, and Chemistry departments, as well as the College's Student Services Division and four-year engineering and computer science programs to maximize students' opportunity for timely completion of courses and successful transfer. Although primarily transfer programs, courses are also available for students who are seeking to update job skills related to engineering and computer science. Engineering and computer science students receive academic support services and professional development opportunities from the College's STEM Center (including the Mathematics, Engineering, and Science Achievement (MESA) Program).
ii. Alignment with the College Values:
Campus Climate,Open Access,Student Success and Equity,Academic Excellence,Community Partnership,Participatory Governance,Sustainability
For each chosen Value, provide a concrete example of how each connects to your program.
Campus Climate: The Engineering and Tech Scholars (ETS) learning community connects students to each other and their faculty beyond the classroom. The cohort-based program supports togetherness and celebrates diversity.

Open Access: The program offers courses in a range of modalities: including face-to-face, online, hybrid, and Hy-Flex. Department faculty are also active in procuring grant funding that has brought in over $4M to the college that supports a wide range or services including: specialized academic support / tutoring in the STEM Center, OEI and subsidized educational materials (e.g. ELEC 265 certification exam fees).

SKY Instructional Comprehensive Program Review

1.E. PROGRAM PERSONNEL

i. Provide the current Full-Time Equivalent (FTE) of each category of personnel:

Full-time Faculty FTE:
2
Adjunct Faculty FTE:
1.85
Classified Professionals FTE:
0.5

ii. Describe any changes in staffing since the last CPR, and how the change(s) have impacted the program. Are there any unmet needs in the program pertaining to program personnel (e.g. staffing, schedule limitations, turnover)? If yes, please specify.
The college has hired a new tenure-track full-time faculty in Computer Science.

1.F. PROFESSIONAL DEVELOPMENT

i. Summarize key professional development that the program personnel have engaged in since the last CPR to meet both the mission of the program, and the aim of the College to increase equity.
Program faculty remain very active in professional development. Our program lead provides professional service in the engineering education community; he was chair of (2018 - 2020) and remains actively involved in the California Engineering Liaison Council (ELC), and is an active board member of both the Two-Year College Division (TYCD) and the Pacific Southwest (PSW) Section of the American Society for Engineering Education (ASEE). Through these organizations, he and other program personnel, including student support specialists, adjunct, and counseling faculty, have attended multiple seminars, workshops, and presentations on a wide range of engineering education topics including DEI initiatives and success strategies, metacognitive and inductive learning, online and hybrid teaching, general teaching techniques, and much more.

Conferences and Professional Development Activity:
- American Society for Engineering Education (ASEE) national and regional conferences
- Engineering Liaison Council (ELC) - bi-annual regional conferences
- The Society of Hispanic Professional Engineers (SHPE) national conferences
- NSF Advancing Technological Education (ATE) Project Director's conference
- League for Innovation in Community College national conference on education
- The Hawaii International Conference on Education (HICE)
- Great Minds in STEM (GMiS) national conference
- The Conference for Industry Education and Collaboration (CIEC) (best poster award 2023, SkyBayTech)
- Summer Engineering Teaching Institute (SETI)
- Reading Apprenticeship (RA) academy

Other PD:
- FLEX Day workshops (e.g Supporting Non-Native Speakers, Canvas training)
- CTTL / QOTL Training

SkyBayTech Electronics program faculty (program lead and adjunct) have also received industry certifications in the Institute of Printed Circuits (IPC) industry standards, including the following:
- IPC J-STD-001 Soldering and Solderability of Electronic Systems
- IPC 7711/7721 Rework and Repair

ii. Are there any unmet needs pertaining to professional development, and potential ways to address these unmet needs? Please specify.
The department appreciates the administration's continued support of professional development opportunities along with support of the grant proposals that have led to and further supported so many of them.

2.A. ACHIEVEMENTS

Describe the program's achievements since the last CPR.
Here's a short list of the achievements:

Successful and/or innovative programming, initiatives and plans:
- Engineering Tech Scholars (ETS) learning community. More details click see the following papers and presentations (links here).
- Engineering Transfer Bridge (ETB) with San Francisco State University (SFSU)
- STEM Pathways Research Scholars winter internship program
- S-SMART collaborative project with SFSU supporting engineering student summer internships and DEI professional development for faculty
- Department support to Math Jam, Physics Jam, and Coding Jam

Fruitful collaborations beyond the program:
- Dual-enrollment in Engineering (ENGR 400) and Electronics (ELEC 111 + 231) with Jefferson High School
- Collaborations with Engineering Liaison Council (ELC)
- Base11: FabLab seed funding and start-up support and Internship Connector
- Growth Sector: STEM Core Initiative and Internship Connector
- UCLA Samueli School of Engineering: Teagle project/internship, Office of Naval Research (ONR) grant
- SFSU School of Engineering: Engineering Transfer Bridge (ETB)
- S-SMART collaborative project with SFSU supporting engineering student summer internships and DEI professional development for faculty

New or updated curriculum:
- New CS courses: COMP 121, 122
- New ELEC courses: ELEC 111, 112, 231, 232, 265, 285, 286

In-reach/outreach efforts:
- In-reach to lower level math courses, supported by STEM Counseling faculty and STEM Retention Specialist
- Dual-enrollment in Engineering (ENGR 400) and Electronics (ELEC 111 + 231) with Jefferson High School
-

Technology or operational improvements:
In the last seven years the department has led the design, research and development, and implementation of the college's brand-new million dollar Fabrication and Electronics Design Lab facility. This initiative has included the research, selection, and installation of the following equipment and infrastructure:
- Rapid prototyping devices: Epilog laser cutter, 2x milling machines, 7x 3D printers of various types (filament and resin based), vinyl cutter,
- Materials testing and processing equipment: Instron universal tensile/compression tester, 2x hardness testers, 2x high-temperature furnaces, Durston rolling mill, metallurgist microscope
- Electronics test equipment: 10x 4-Ch oscilloscope, 10x full arbitrary waveform generator, 2x spectrum analyzer, 20x 3-ch power supply, 10x electronic load, 10x 6.5 digit DMM, 10x 5.5 digit DMM
- Electrical and HVAC

Other technology and operational improvements:
- MacLab: 40x high performance iMac computers to support Computer Science instruction and the department's new iOS app development course (and TBD pathway)
- STEM Center technology: 20x high performance tablet laptops to support online and face-to-face tutoring
- FabLab containers: 2x repurposed/refurbished storage containers to support engineering design projects

- Smart Classroom: technology enhanced classroom with turnkey audio/video and digital whiteboard support for online and Hy-Flex teaching

Successful use of data to improve student outcomes and equity:
- Course level SLO assessment and subsequent curricular changes
- Transfer student exit survey

Maintenance of high levels of excellence:
- Involvement with statewide articulation and engineering model curricula through ELC and Engineering Faculty Discipline Review Group (FDRG)
- Program lead serves on the Engineering Technology (ET) FDRG
- SkyBayTech electronics curriculum is aligned with Institute of Printed Circuits (IPC) standards and has certification embedded into the program.
- SkyBayTech electronics faculty have become certified IPC trainers in the J-STD-001 and 7711/7721 standards.

New degrees, certificates, and/or pathways:
- AS-T Computer Science
- AS Civil Engineering
- AS Computer Engineering
- AS Electrical Engineering
- AS Mechanical Engineering
- AS Engineering
- Certificate of Specialization: Electronics Assembly and Fabrication
- Certificate of Achievement: Electronics Repair Technician

2.B. IMPACTS ON PROGRAM

Describe the impacts on your program (positive or negative) by legislation, regulatory changes, accreditation, grantors, community/school partnerships, college-wide initiatives, stakeholders, and/or other factors.

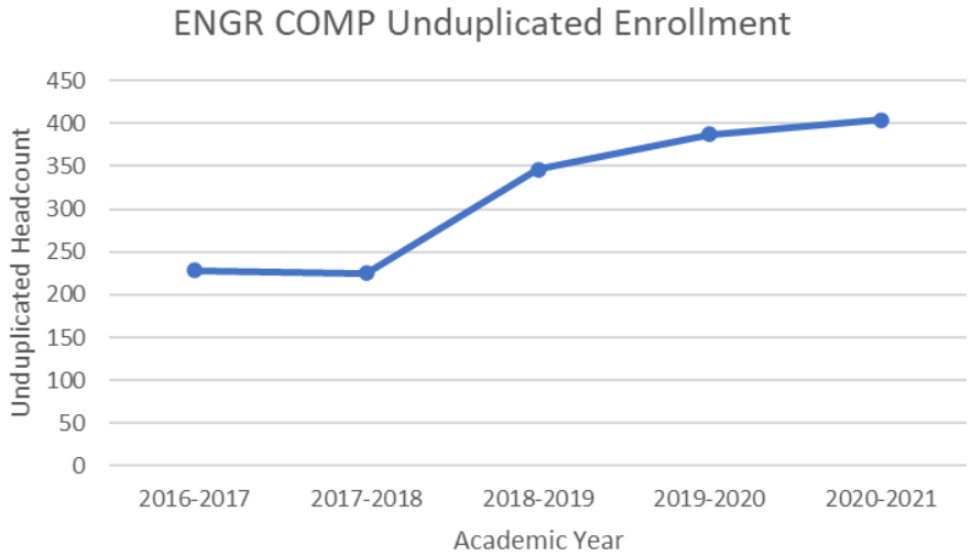
- AB705
- AB1111
- DHSI Title V STEM Pathways project
- NSF ATE SkyBayTech project

ACCESS

3.A. PROGRAM ENROLLMENT

What enrollment trends do you observe, and what may account for these trends?

We've seen a substantial and persistent increase in unduplicated enrollment in the program over the last five years from the 2016 to 2021 period. The 2021 enrollment figures close to doubling those of 2016, at an overal 77% increase. We believe the increase is due to the enhanced number of courses offered at the college as the program has grown from its inception in 2016, along with recruitment and engagement activities around the Engineering and Technology Scholars (ETS) learning community. The program has added a total of 15 new courses since it's inception in 2016.



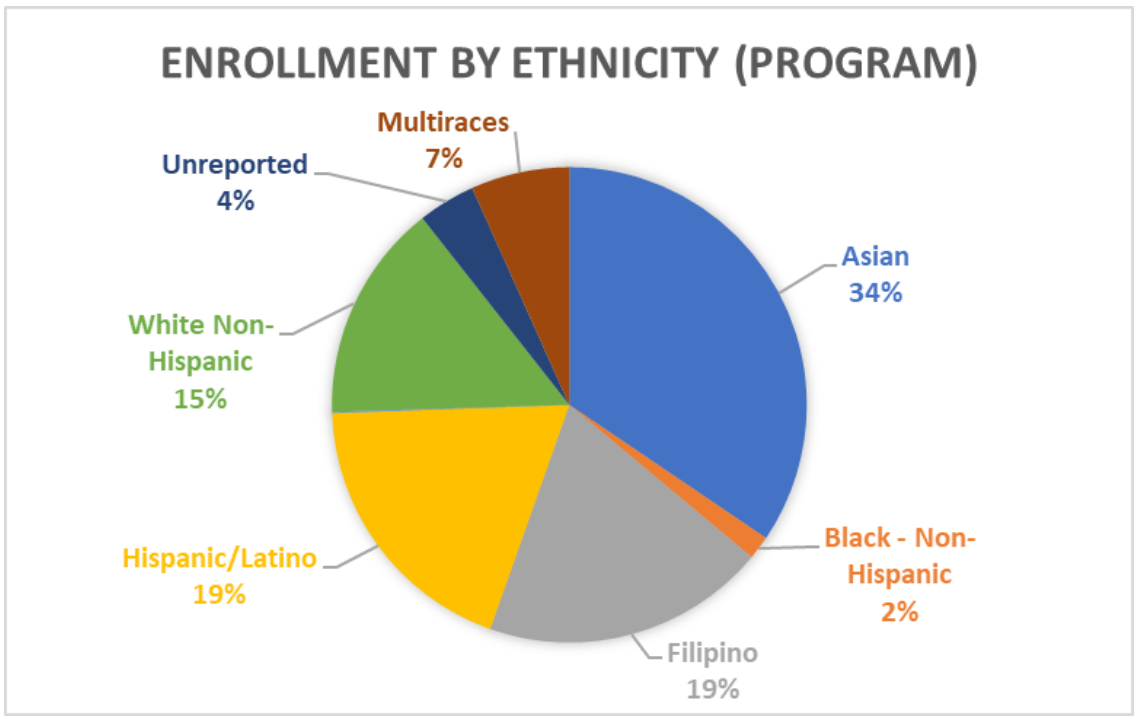
- Number of new sections
- ETS enrollment history
- Dedicated ETS support specialist
- ENGR/COMP enrollments

3.B. EQUITABLE ACCESS

Provide an analysis of how students, particularly historically disadvantaged students, are able to access the program. Specific questions to answer in your response:

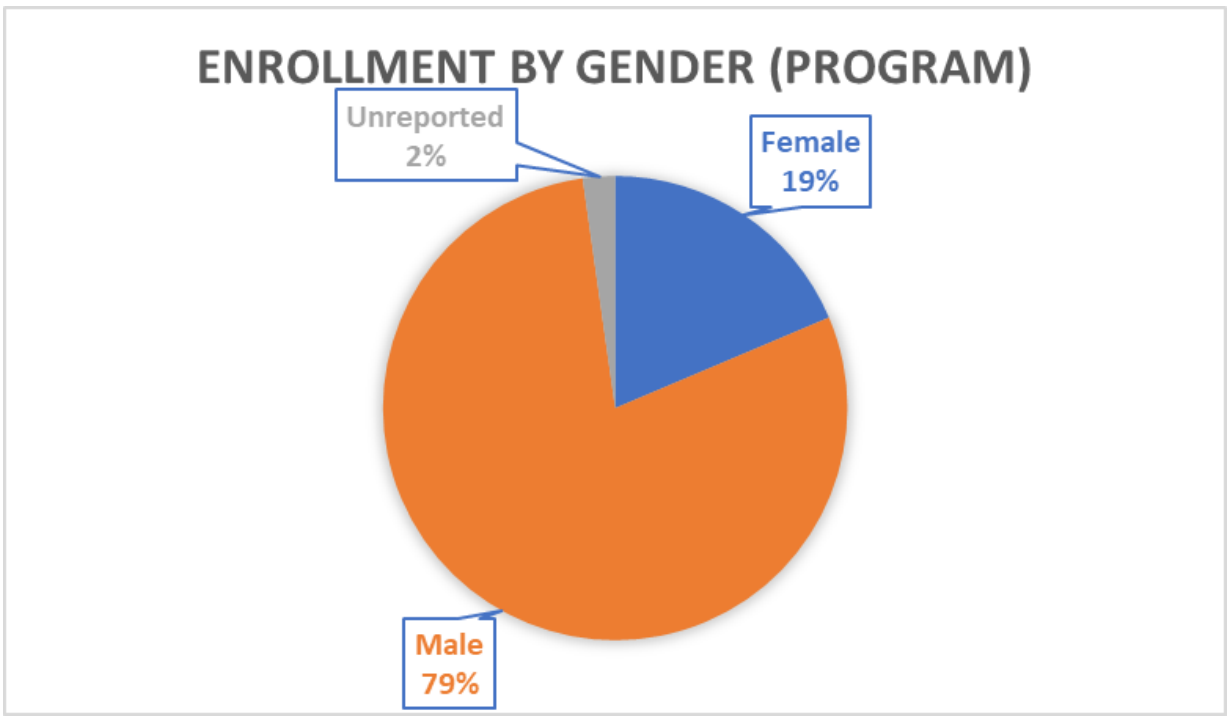
i. PROGRAM ACCESS: How do your program enrollment demographics compare to that of the College as a whole and/or Division? What differences, if any, are revealed? What program, institutional, and/or external factors may have impacted equitable access, whether positively or adversely?

Figures 3b-1 and 3b-2 below show program demographics. The program enrolls students from a variety of ethnic backgrounds relatively consistent with the overall college population with 34.4% Asian, 1.6% African American, 19.3% Filipino, 19% Hispanic, 14.8% Caucasian, 6.7% Multiracial, 3.9% unreported, and less than 1% Pacific Islander.



Hispanic student enrollment at 19% is a little low as compared to the college average of 29.8%. We are not aware of any programmatic or institutional factors impacting Hispanic students' access to the program. In fact, we have implemented strategies specifically intended to enhance recruitment and support of Hispanic and low-income students through the STEM Pathways grant project which was developed and is led by department faculty (more below in section iii).

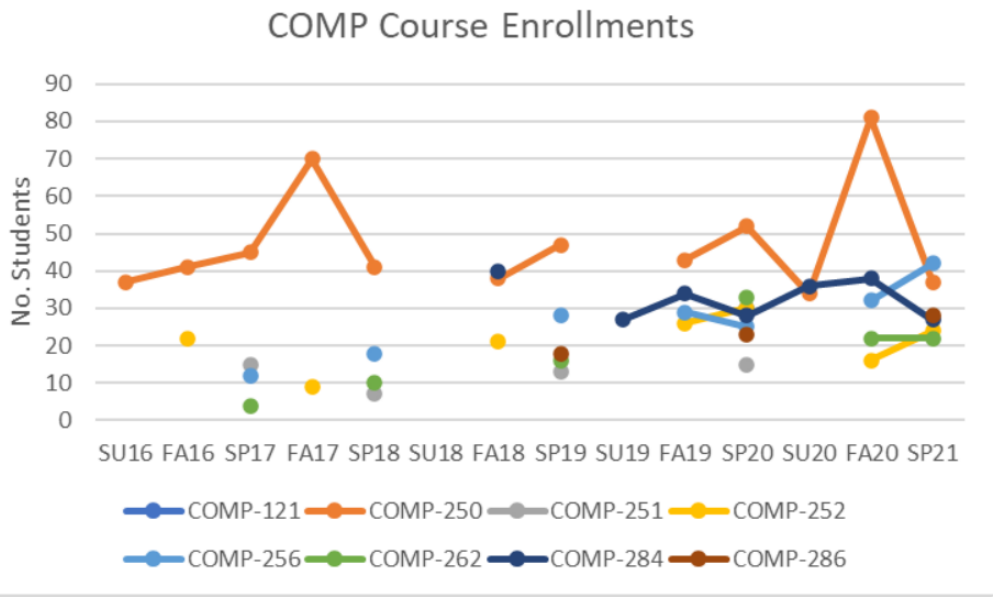
Figure 3b-2 below shows overall enrollment disagregated by gender in the Engineering/Comp program. Female student enrollment in the program is low (18.6%) as compared to the college average (53.5%). While these enrollment numbers are relatively comparable to statewide figures of degree attainment in the engineering and computer science fields, the department is engaging in community-based activities that we hope ultimately bolster access and recruitment for female students, and are looking to identify further strategies to adopt.



ii. COURSE ACCESS: Provide analysis of enrollment trends for each course. Which course(s) have declining enrollment, and why might that be the case? What insights do you gain from the impact of course offering patterns?

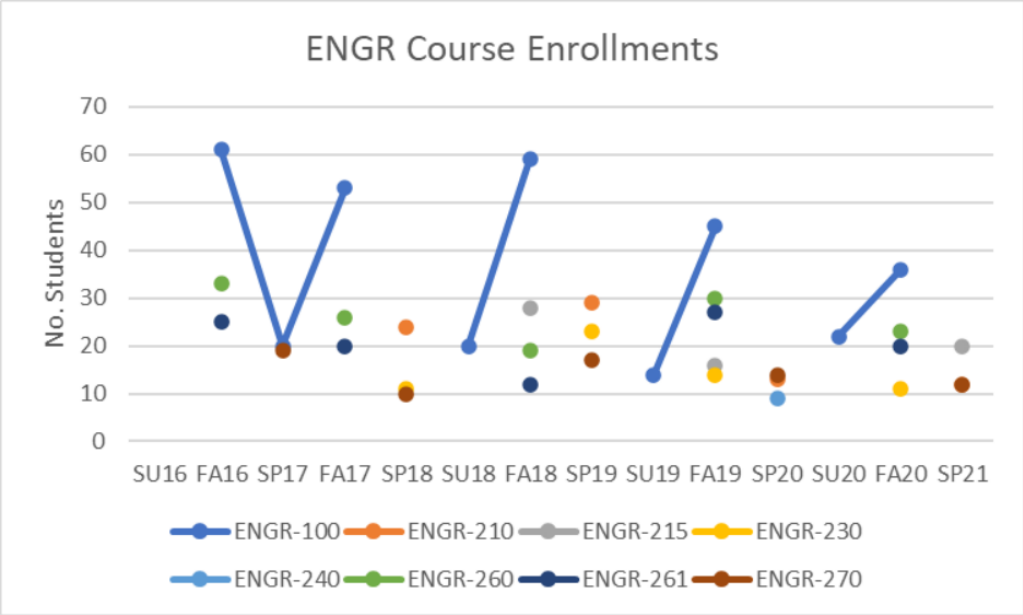
Computer Science:

Below are Computer Science enrollments over the CPR analysis period. Accounting for summer courses, which traditionally have seen lower enrollments, we observe a general increasing trend in enrollment for all courses. One of our courses (COMP 250) has grown to two sections in the Fall semester, showing peaks in some Fall semesters (FA17, FA20) in which there appear to have been higher student demand. All COMP courses have stable or increasing enrollments, no declining enrollments.



Engineering:

Below are course enrollments for the primary/transferrable Engineering courses. All courses except ENGR 100 are offered only once per academic year in non-consecutive semesters (hence no linear interpolation lines). Over the period, we observe a general decline in most ENGR course enrollments, with the most noticeable declines after the Spring 2020 semester and beginning of the COVID-19 pandemic. We also attribute the higher enrollments in the first three academic years (Fa16 - Sp19) with several factors: 1) these were the college's first offerings of these courses and we likely had a backlog of students needing them, and 2) the ETS learning community had more robust and lucrative recruitment strategies in place and brought more students into the program. These recruitment and support strategies were later softened due to personnel turnover and temporarily vacated positions.



iii. What efforts, if any, have been made to increase equitable access to your program? If more is needed, consider making it one of your program goals in the Action Plan.

The department has led or contributed to efforts within the community to enhance equitable program access, including hosting STEM exploration events for middle- and high-school students, concurrent- and dual-enrollment programming, and the development of STEM learning communities and recruitment efforts.

FT faculty in the department have also led the development and implementation of several grant-funded projects that are designed to, among other goals, increase access and success for our STEM students generally, with specific functions supporting Engineering, Computer Science, and most recently Electronics Technology students. Below is description of various grant projects and their components that related to access.

The STEM Pathways project:
Developed and led by department FT faculty, the STEM Pathways grant is designed with intention to increase success for Hispanic and low-income students. More details to be provided shortly.

The SkyBayTech project:
Developed and led by department FT faculty, the SkyBayTech project is centered around the development of the college's new Electronics Manufacturing Technician career technical education (CTE) program. One of the program's merits is the inclusion of contextualized mathematics, and a non-calculus based program for students to enter the local STEM workforce right from Skyline College, with built-in industrial certificate attainment opportunities at vastly reduced costs for students. The department believes this alternative pathway into the STEM workforce supports students with prior math anxiety through degree attainment, job placement, and potentially further study into the Engineering and Computer Science pathways.

EFFECTIVENESS

4.A. OVERALL AND DISAGGREGATED COURSE SUCCESS RATES
Comment on course success rates and with particular attention to any observed equity gaps. Specific questions to answer in your responses:

i. How do the overall course success rates compare to the College and/or Division success rates?

Computer Science:

Figure 4A-1 below shows overall course success rates for Computer Science, showing averages +/- 1.0 standard deviation. We observe that most overall course averages meet or exceed the college success rate of 77% . In the few cases the overall averages are lower, we see the success rates are statistically coincident with the college average over the CPR period: 77 +/- 4% (1.0 standard deviation). These courses are COMP 250, COMP 284 (both entry- to intermediate-level courses in object-oriented programming), and COMP 252 (sophomore-level Data Structures: C++).

The department has reviewed overall and dissagregated success metrics for COMP 250/284 carefully and are integrating curricular revisions to the CoR that we expect to enhance success for all students. Overall rates for the higher-level COMP 252 are lowered by substantially low success rates within specific semesters, in which the department wonders if this may be due to instructional and assessment methods employed during this period.

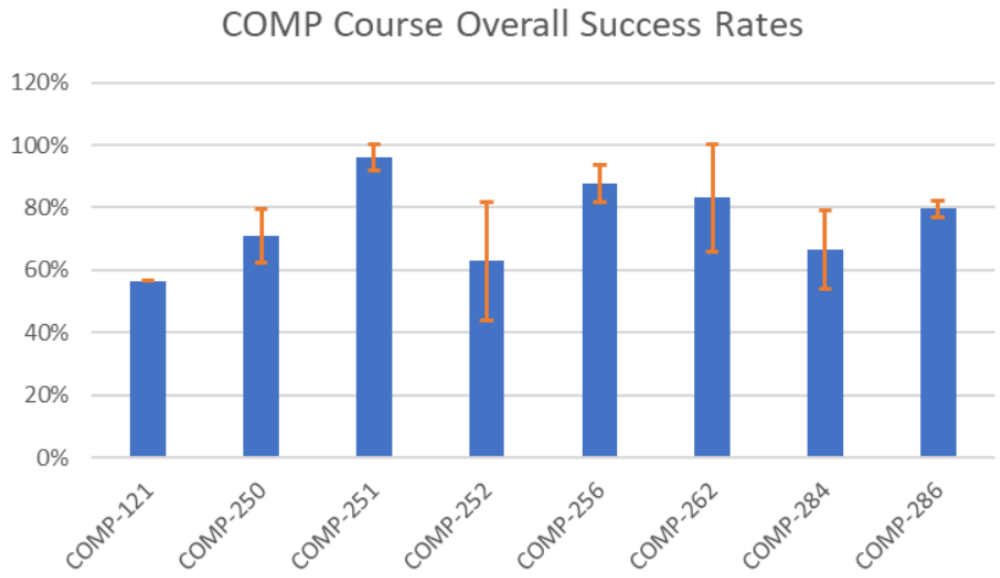


Figure 4A-1

The graph above also shows COMP 121 with a troublingly low success rate at 57%. It should be noted that this course was offered only once within the CPR period during the Sp20 semester, which took place at the beginning of the pandemic and subsequential emergency shelter-in-place order and campus closure. COMP 121 is structured as a F2F class (at least for lab) for students to work on the iOS app development system using the Mac computers in 8-8121. Teaching the course remotely resulted in compromised instruction and success rates suffered that semester.

Before COMP 121 was developed as an official course in the department, it was piloted with the same course structure (units, contact hours, instructional/assessment methods, etc) as an experimental course COMP 680SA. Aggregating the success figures of COMP 680SA (Sp18, Sp19) along with COMP 121 (Sp20), we see a much better overall success rate (69 +/- 11%), statistically coincident with the college average over the CPR period. Figure 4A-2 shows the aggregated data below.

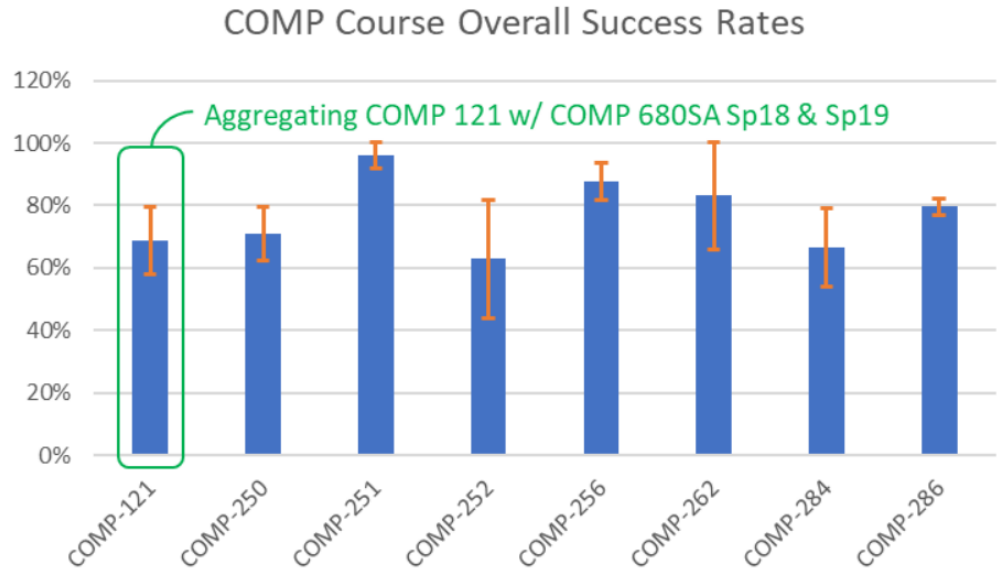


Figure 4A-2

Engineering:

Figure 4A-3 below shows overall course success rates for Engineering Science, showing averages +/- 1.0 standard deviation. We observe that all aggregate course averages exceed or are statistically coincident with the college average over the CPR period: 77 +/- 4% (1.0 standard deviation).

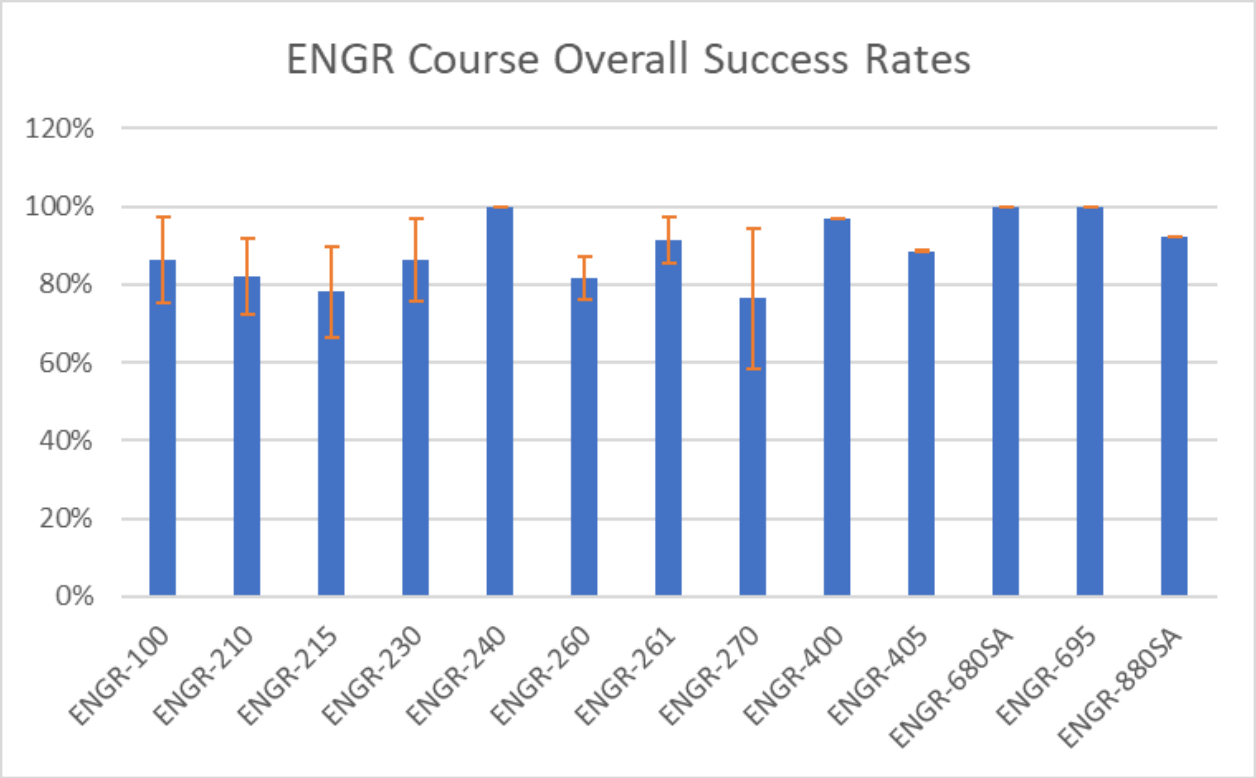


Figure 4A-3

ii. What have you learned from reviewing the overall and disaggregated course success data? Choose disaggregations which are most relevant to programming decisions (e.g. ethnicity, gender, age, enrollment status, and/or disaggregations that are unique to your program).

Figure 4A-4 below shows success rates disaggregated by gender. While female and unreported gender groups' enrollment is low as compared to the college averages (yet comparable to state- and nation-wide averages), overall programmatic success rates remain high for both groups (79% and 90%, respectively). Overall success rate for males is 78%.

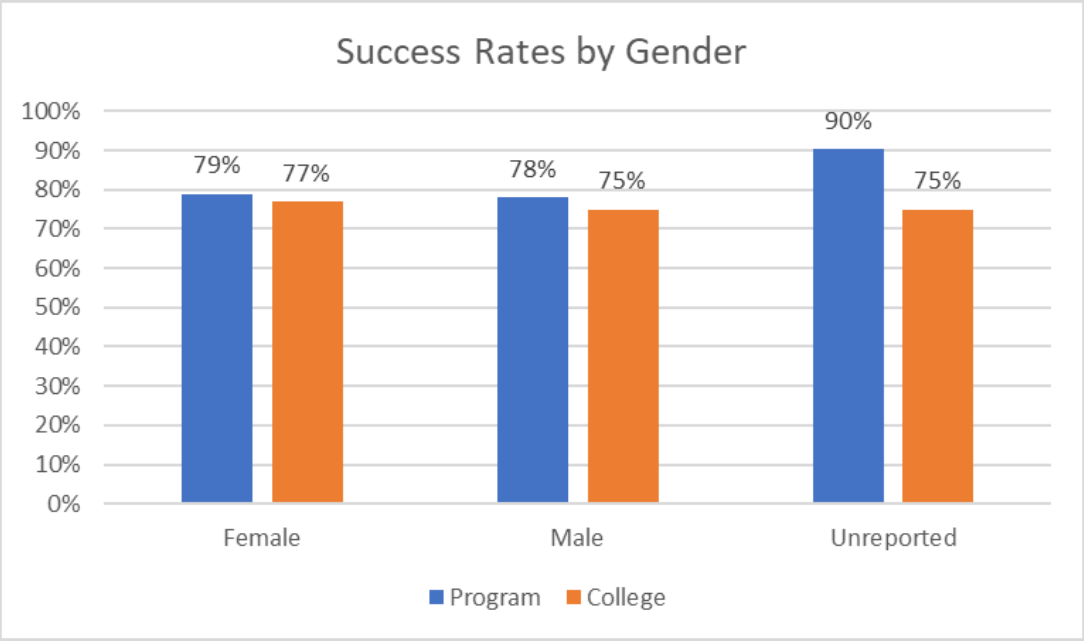


Figure 4A-4

Figure 4A-5 below shows success rates disaggregated by ethnicity. Overall success rates for Hispanic students is a little low at 69%. While enrollment is low for African American students, success rates are low at 63%.

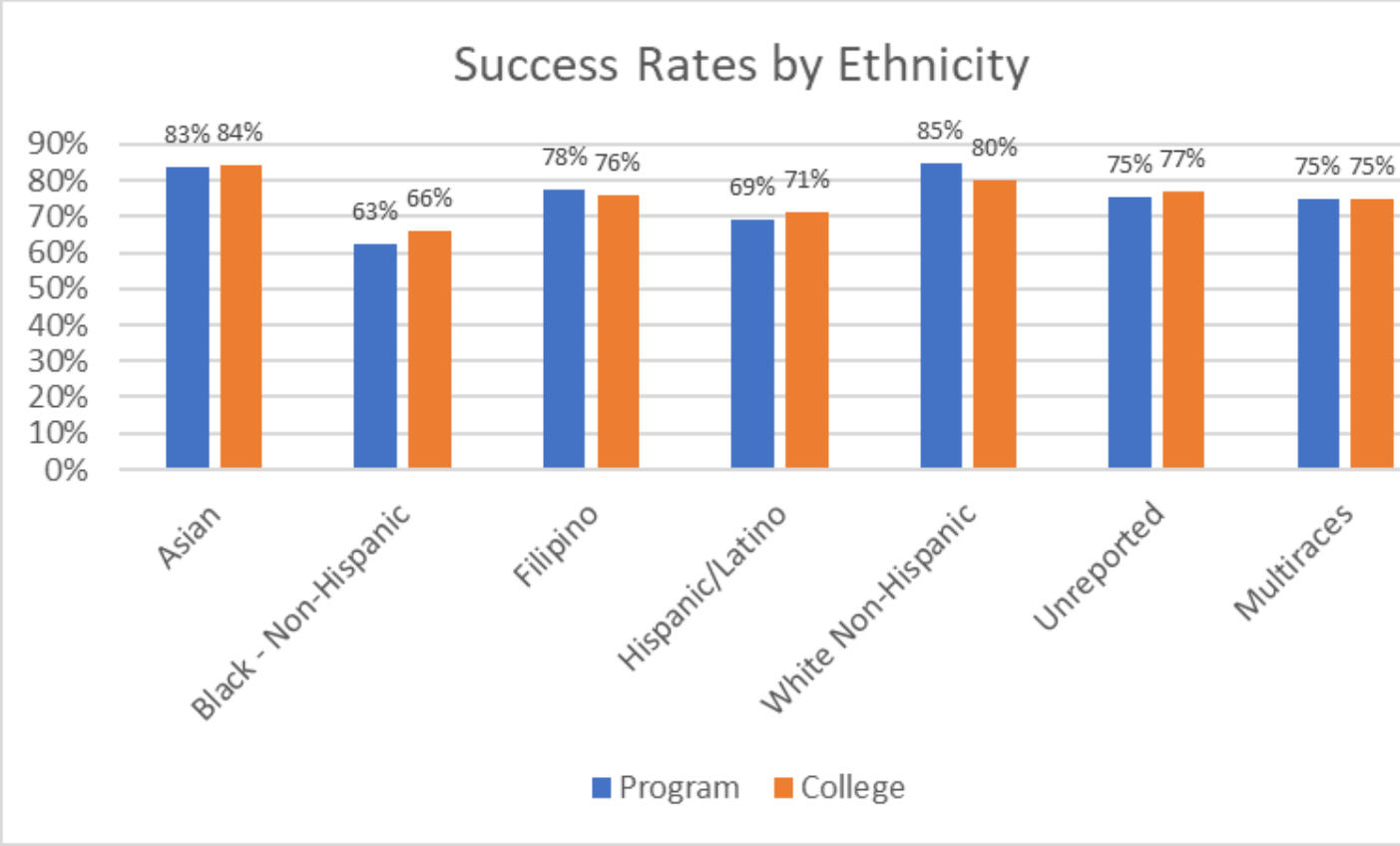


Figure 4A-5

The department has also examined success rates disaggregated by age and observes the following:

- Our middle college students (age 18 and under) do exceedingly well at 89% success.
- Graduating high schoolers (age 18-22), our largest student age group at 59.1% program enrollment, also does well overall at 80% success rate.
- Our students in age bands 29-39 and 40-49 have relatively low success at 67% and 74% respectively

4.B. INDIVIDUAL COURSE SUCCESS RATES

Provide analysis of success rates for each active course. Is there a minimum success rate that you consider acceptable, and if so, what is it and why? Which courses are not at the acceptable minimum success rate? Which exhibit a success rate over time that fluctuates fairly dramatically? Which other courses are of concern to you, and why?

Computer Science:

Consistent with course-level SLO success thresholds, the department considers 70% an acceptable minimum success rate. While each COMP course overall success rate statistically meets this minimum (Fig 4A-2 above), we've identified a few courses that have somewhat lower overall course success rate averages; specifically COMP 250, 252, and 284.

Figure 4B-1 below shows a graph of course success rates by semester in computer science. Courses with substantial success rate fluctuation include COMP 250, COMP 252, and COMP 284. This is consistent with the lower overall coures success averages we'd like to improve upon. It should be noted that some of the wider fluctuations are unsurprisingly anchored in the Sp20 "shelter-in-place" semester (e.g. COMP 250, 284).

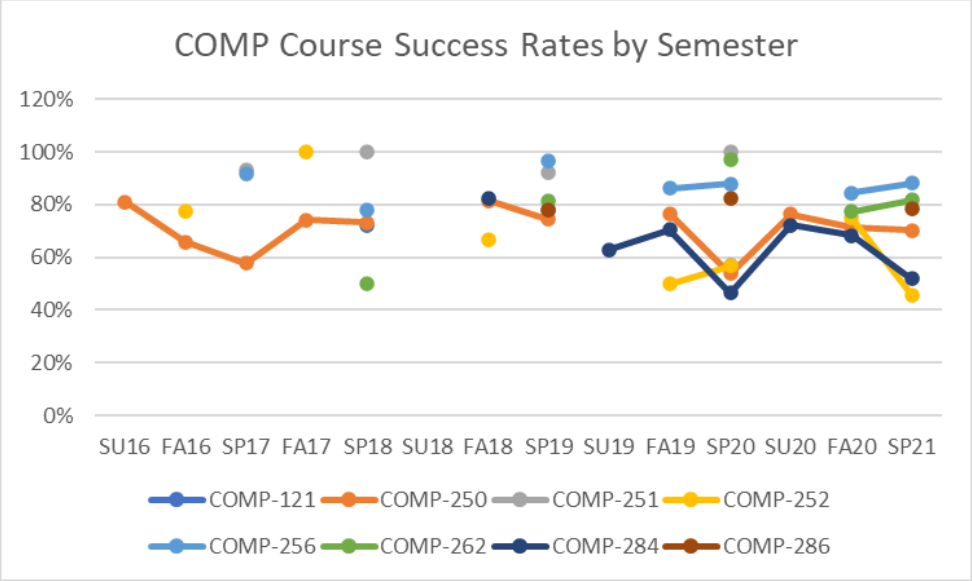


Figure 4B-1

Engineering:

Figure 4B-2 below shows a graph of course success rates by semester in engineering. Courses with substantial success rate fluctuation include ENGR 100, ENGR 215, and ENGR 270. The trends for ENGR 215 and ENGR 270 are consistent with the lower overall coures success averages we'd like to improve upon. Similar to computer science, some of the wider fluctuations are anchored in or come after the Sp20 "shelter-in-place" semester and subsequent shift to online instruction.

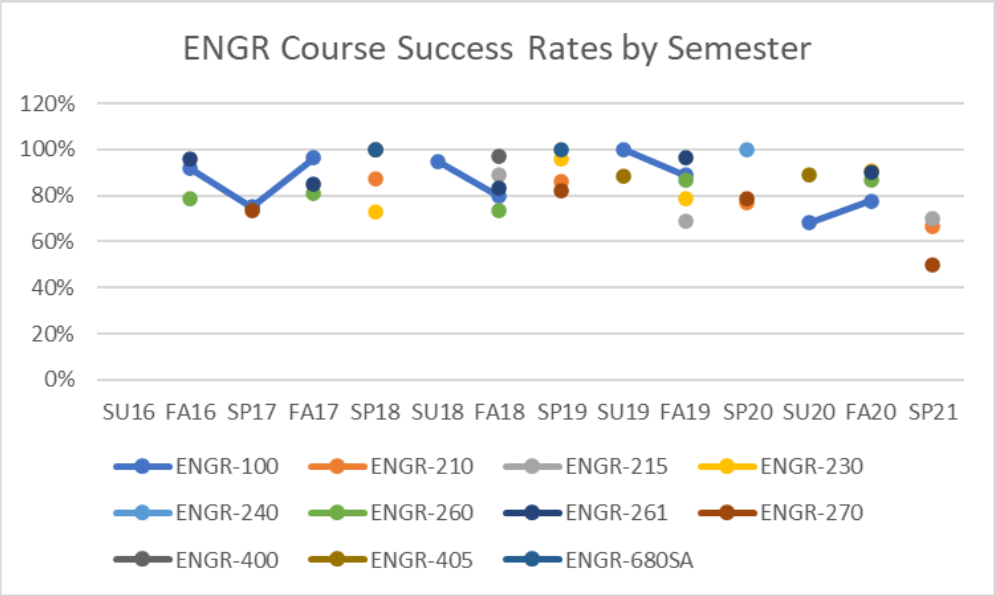


Figure 4B-2

4.C. COURSE AND PROGRAM SLO RESULTS

What notable conclusions were drawn from the assessment results? If available, note any differences in assessment results by key disaggregations (e.g. modality, learning communities, etc.). What have been the implications for the program? Specific questions to answer in your response:

i. What percentage of course SLOs have been assessed during the past five years?

Number of Course SLOs:

30

Percentage:

76.9

4.D. COURSE ENHANCEMENTS

4.E. DEGREES AND CERTIFICATES

List each of the degrees and certificates separately. Comment on the number and trends in degrees/ certificates awarded by your program. Specific questions to answer in your responses:

4.F. LABOR MARKET CONNECTION

4.G. STUDENT FEEDBACK

4.H. CURRICULUM

Programs are required to update all curriculum and secure approval by the Curriculum Committee. Please indicate whether the following tasks have been completed.

Secured approval of updated courses by the Curriculum Committee

Yes

KEY FINDINGS

Using key findings based on the analysis from this CPR cycle, develop a multi-year plan designed to improve program effectiveness and promote student learning and achievement. Commit to three-to-five new and/or ongoing goals total. Enter goals via Step 2: Goals and Resource Requests.

5.A. CHALLENGES AND CONCERNS

GOAL

#P1 Increase URM recruitment & retention in ENGR/COMP/ELEC

Goal and Desired Impact on Students
Increase recruitment and retention of underrepresented minority students, including Hispanic, African American, and female students.

Year Initiated
2022 - 2023

Implementation Step(s) and Timelines
1) Hire a dedicated ETS retention specialist
2) Enhance and expand outreach activities
3) Enhance and expand dual-enrollment partnerships
4) Develop and implement EYH workshop(s)
5) Continue to coordinate with STEM Center on student services

Mapping
- SKY College Values: (X - Selected)
  - Academic Excellence: X
  - Campus Climate: X
  - Community Partnership: X
  - Open Access: X
  - Participatory Governance: X
  - Social Justice: X
  - Student Success and Equity: X

Resource Request

Division Name
Science, Technology, Engineering, and Mathematics (STEM)

Year of Request
2022 - 2023

Resource Type
Classified Professional/Administrator Position (permanent)

Resource Name
Dedicated STEM Retention Specialist for ETS

Resource Description
Embedded STEM Retention Specialist to support the Engineering and Tech Scholars (ETS) learning community

Funds Type – Mark all that apply.
Recurring Cost

Briefly explain how this request helps to advance the goals and priorities of your program, the College, the District, and/or the California Community College Chancellor's Office.
The embedded ETS Retention Specialist would support the college's goals of guided pathways and the meta majors college redesign through recruitment and retainment strategies as a touchstone component of the integral student success team. The role would be designed to bolster and support enrollments, engagement, and persistence in physical sciences in STEM including Math, Physics, Chemistry, Engineering, Computer Science, and Electronics Engineering Technology.

Cost
100,000

Level of need, with 1 being the most pressing
1

FOR ADMINISTRATIVE USE ONLY

GOAL

#P2 Strengthen internship and partnerships through expansion of Fab Lab & Electronics Lab facilities and services

Goal and Desired Impact on Students

Enhance and expand facilities and services in the Fab Lab and Electronics Lab, including expanding the open lab hours to support students, faculty, and the greater community. This would also provide much needed support for auxiliary and synergistic projects like nEXO, STEM Pathways Research Scholars, EYH, and campus tours/workshops for local middle and high school partners (EYH, JUHSD events, etc). The additional personnel and support would facilitate greater engagement and collaborations in STEM clubs (e.g. ERC, Computer Science Club, WISER!, PAC, etc.). Investing in supporting the fab lab and electronics labs will also strengthen partnerships with local industry as well. The impact for students is increased opportunity for hands-on and applications learning, increased engagement/retention, greater connection to internship and entry-level job opportunities, and professional development beyond the standard curriculum.

Year Initiated

2022 - 2023

Implementation Step(s) and Timelines

1) Hire a second full-time Lab Coordinator (LC) for PHYS/ENGR/COMP/ELEC. This position in collaboration with our existing LC would support and address needs in PHYS as well.
2) Provide professional development (PD) to both LC's in operation, maintenance, and usage of existing and new fabrication and electronics equipment
3) Provide PD training to both LC's to become industry certified in Electronics Lab equipment built into the ENGR/COMP/ELEC programs
4) Expand the operating hours of the fab and electronics labs, club activities, and outreach and support to the community

Mapping

- SKY College Values: (X - Selected)
  - Academic Excellence: X
  - Campus Climate: X
  - Community Partnership: X
  - Open Access: X

Resource Request

Division Name

Science, Technology, Engineering, and Mathematics (STEM)

Year of Request

2022 - 2023

Resource Type

Classified Professional/Administrator Position (permanent)

Resource Name

Full time Lab Coordinator for ELEC/ENGR/PHYS

Resource Description

Lab Coordinator to support the ELEC/ENGR/PHYS programs

Funds Type – Mark all that apply.

Recurring Cost

Briefly explain how this request helps to advance the goals and priorities of your program, the College, the District, and/or the California Community College Chancellor's Office.

The full time Lab Coordinator (LC) would support the college's Electronics, Engineering, and Physics programs, in addition to the Electronics and Fabrication labs, both of which contain cutting edge, highly specialized manufacturing equipment. The LC would support maintenance and operation of these premiere lab facilities, essential to instruction in our programs, especially in Materials Science and Engineering, Electronics manufacturing, Circuits and Devices labs, Microcontrollers and IoT courses. The LC would also facilitate much needed lab staffing for student club activities, campus tours and workshops both internal and with our local middle and high school partners, and open lab hours to the community.

Cost
100,000
Level of need, with 1 being the most pressing
1
FOR ADMINISTRATIVE USE ONLY

GOAL

#P3 Strengthen student success and retention through enhanced Engineering and Computer Science curriculum

Goal and Desired Impact on Students
Strengthen existing engineering and computer science curriculum by integrating course content that connects more to students' lived experiences through modules on technology's influence on societal and environmental issues, and the opportunity to be contribute to solving the world's challenges. The modules are primarily intended for first-year courses (e.g. ENGR 100, COMP 121, COMP 250, COMP 284). The revisions are anticipated to strengthen engagement and retention in these courses, which is tied to Goal #1. While the retention focus is on first-year courses, the department is planning to integrate content of societal impact in subsequent courses as well (e.g. ENGR 270 - Materials Science, COMP 252/286 - Data Structures), which is intended to support students continuing their larger systems-level design, and support success and retention.

Year Initiated
2022 - 2023

Implementation Step(s) and Timelines
1) Implement the changes at the course outline level via curriculum revision (22-23)
2) Develop modules connecting course content to societal and environmental impact (23-24)
3) Pilot modules in these courses (over 23-24 and 24-25 academic years)
4) Measure outcomes and engagement in these modules
5) Assess overall SLOs, retention, and success in these courses
6) Report outcomes in PRU
7) Revise as needed

Mapping
- SKY College Values: (X - Selected)
  - Academic Excellence: X
  - Campus Climate: X
  - Social Justice: X
  - Sustainability: X

GOAL

#P4 Enhance the College's STEM pathways through expansion of Computer Science Program

Goal and Desired Impact on Students
Expand computer science program to include new courses on web and mobile software development. This would include a databases course, which would also support the college's new Data Science program. The courses would support students to learn web development, backend management, and mobile app development, continuing on the department's introductory iOS programming course. The expanded curriculum is expected to help students round out their skillset, in addition to internship and entry-level positions. The curriculum will be packaged into a "junior developer" certificate and other certs.

Year Initiated
2022 - 2023

Implementation Step(s) and Timelines

1) Develop new web, database, and mobile curriculum (22-23)
2) Develop "Junior Developer" certificate (22-23)
3) Engage industry partners and strengthen internship opportunities (ongoing)
4) Pilot new curriculum (23-24 and 24-25)
5) Measure outcomes and internship attainment
6) Report in PRU
7) Revise and improve as needed

Mapping

- SKY College Values: (X - Selected)
  - Academic Excellence: X
  - Community Partnership: X
  - Student Success and Equity: X

GOAL

ELEC #1: Enhance and Expand Electronics Program Curriculum

Goal and Desired Impact on Students

Strengthen and expand the Electronics Technology program through new curriculum and local certificates from a total of five courses and one Certificate of Specialization to a total of at least eight courses and one additional Certificate of Achievement

Year Initiated

2022 - 2023

Implementation Step(s) and Timelines

1) Develop new curriculum including ELEC 285, 286, and 422 (22-23, 23-24)
2) Develop new Certificate of Achievement in Electronics Repair (22-23)
3) Complete state requirements and paperwork for new Certificate of Achievement (23-24)
5) Pilot new curriculum (23-24, 24-25)
5) Measure certificate completion as a percentage of our student cohort enrollments (24-25)

GOAL

ELEC #2: Strengthen Program Lab Facilities and Industry Alignment

Goal and Desired Impact on Students

Strengthen and expand the Electronics Technology program through enhanced laboratory facilities and operations, along with increased globally-recognized industry certifications embedded into the curriculum and electronics lab. The impact is greater job placement for students through a strengthening of our local technician workforce pipeline. The embedded industry certifications from the Institute of Printed Circuits (IPC), taught by Skyline faculty in the electronics lab, will save students $3000 - $12,000 in IPC certification course fees normally found in industry, depending on the number of certifications they complete with the program at Skyline.

Year Initiated

2022 - 2023

Implementation Step(s) and Timelines

1) Research and purchase new and enhanced electronics manufacturing equipment including complete soldering rework and repair stations, solder puts, fume extraction systems, analog and digital magnification solutions, electronics components and component storage, electronics cleaning tools and supplies, and associated accessories.
2) Hire a second full-time Lab Coordinator (LC) for PHYS/ENGR/COMP/ELEC to support the Electronics lab and program. This position in collaboration with our existing LC would support and address needs in PHYS as well.
3) Provide certification training to electronics faculty and the LC's to become certified IPC trainers, trained on the equipment in the electronics lab.

Mapping

- SKY College Values: (X - Selected)
  - Academic Excellence: X

- Campus Climate: X
- Community Partnership: X
- Open Access: X

Resource Request

Division Name
Science, Technology, Engineering, and Mathematics (STEM)

Year of Request
2022 - 2023

Resource Type
Classified Professional/Administrator Position (permanent)

Resource Name
Full time Lab Coordinator for ELEC/ENGR/PHYS

Resource Description
Lab Coordinator to support the ELEC/ENGR/PHYS programs

Funds Type – Mark all that apply.
Recurring Cost

Briefly explain how this request helps to advance the goals and priorities of your program, the College, the District, and/or the California Community College Chancellor's Office.
The full time Lab Coordinator (LC) would support the college's Electronics, Engineering, and Physics programs, in addition to the Electronics and Fabrication labs, both of which contain cutting edge, highly specialized manufacturing equipment. The LC would support maintenance and operation of these premiere lab facilities, essential to instruction in our programs, especially in Materials Science and Engineering, Electronics manufacturing, Circuits and Devices labs, Microcontrollers and IoT courses. The LC would also facilitate much needed lab staffing for student club activities, campus tours and workshops both internal and with our local middle and high school partners, and open lab hours to the community.

Cost
100,000

Level of need, with 1 being the most pressing
1

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GOAL

ELEC #3: Enhance Program Recruitment

Goal and Desired Impact on Students
Strengthen and expand the Electronics Technology program through enhanced recruitment efforts and expanded dual-enrollment programming and integration. The impact for students is greater access to the Skyline College courses and pathway to the STEM workforce.

Year Initiated
2022 - 2023

Implementation Step(s) and Timelines
1) Hire a dedicated ETS retention specialist (RS)
2) Work with RS to develop and implement new and enhanced outreach activities
3) Enhance dual-enrollment partnerships with Jefferson
4) Develop and implement EYH workshop(s)
5) Continue to coordinate with STEM Center on student services

Mapping
- SKY College Values: (X - Selected)
  - Academic Excellence: X
  - Campus Climate: X
  - Community Partnership: X
  - Open Access: X

- Participatory Governance: X
- Social Justice: X
- Student Success and Equity: X

Resource Request

Division Name
Science, Technology, Engineering, and Mathematics (STEM)

Year of Request
2022 - 2023

Resource Type
Classified Professional/Administrator Position (permanent)

Resource Name
Dedicated STEM Retention Specialist for ETS

Resource Description
Embedded STEM Retention Specialist to support the Engineering and Tech Scholars (ETS) learning community

Funds Type – Mark all that apply.
Recurring Cost

Briefly explain how this request helps to advance the goals and priorities of your program, the College, the District, and/or the California Community College Chancellor's Office.
The embedded ETS Retention Specialist would support the college's goals of guided pathways and the meta majors college redesign through recruitment and retainment strategies as a touchstone component of the integral student success team. The role would be designed to bolster and support enrollments, engagement, and persistence in physical sciences in STEM including Math, Physics, Chemistry, Engineering, Computer Science, and Electronics Engineering Technology.

Cost
100,000

Level of need, with 1 being the most pressing
1

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