

Section 1 and 3 - Analysis of Unit PIE & Updates on Goals



PIE - Natural Sciences Division Manager

2020-21

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Division Mission Statement: The Natural Sciences Division is committed to providing quality STEM education, services, and workforce training so that students become productive members of a diverse, sustainable, and global society.

Analysis of conditions and resulting plans, activities, resources, progress and critical decisions.: The Natural Sciences Division is composed of nine departments/programs and offers degree, certificate and transfer programs in agricultural sciences, astronomy, biological sciences, chemistry, computer science, earth sciences, engineering, mathematics, and physics. Our commitment to providing a learning environment that enhances student success is supported by the state-of-the-art Science Center, boasting a number of special features, labs and amenities to facilitate innovative instruction and programs.

Before highlighting the amazing work of each of the units, here is some overall analysis on Enrollment, Retention, Success, and Awards.

ENROLLMENT:

Analyzing enrollment trends through the pandemic has been interesting. We have included numbers from 2018-19, 19-20, 2021 as reported in Power BI.

ENROLLMENT:

2018-19: 49,353

2019-20: 50,793

2020-21: 50,120

CAUTION: We believe the numbers from 20-21 may not be accurate. For example, Power Bi shows that we have 100% retention for that year. While we tend to trend high on retention, that number cannot be accurate. Next, as emphasized in the Enrollment Management Academy (7/12-7/15 2021) we should NOT use the data from the COVID period as predictive of future trends. For example, many units experienced a drop in enrollment during COVID. However, the NSD experienced a bump. The explanation is two-fold. First, during "normal" on campus scheduling, we are bound by lab space. As the chair of the Biological Sciences tells us, "we could offer an infinite number of Anatomy, Physiology, and Microbiology classes if we just had space." Second, through the hard work and ingenuity of our amazing faculty and staff, we were able to create remote labs during the pandemic. Throughout the PIE document, you find references to this herculean effort. As such, we were able to add more labs since we were not bound by space.

RETENTION:

The NSD tends to have very good retention rates. We are pleased to see that we are trending upward. However, as mentioned before, we believe the 20-21 number to be too good to be true.

RETENTION:

2018-19: 84.6%

2019-20: 88.7%

2020-21: 100%

SUCCESS:

The NSD tends to trend lower than the college average in terms of success. Quite simply, Science and Math courses are tough

for students. However, with an increase in awareness of equity and diversity issues coupled with targeted efforts by faculty members (such as the Community of Practice) we are experiencing an upward trend in success rates. Worth noting is that both Latinx and Black/African American students who are enrolled in STEM courses and have visited the STEM Center 4 or more times have 15.3% higher success rates than those who have not.

SUCCESS:

2018-19: 63.1%
2019-20: 69.9%
2020-21: 84.4%

AWARDS:

In terms of awards, there was quite a dip during COVID. Analysis here indicates that although more basic lab courses were offered, many capstone courses for degrees and certificates were not offered as they required hands on demonstrations of competency. A good example is AVMA requirements in the AG area where many of our certificates reside. In collaboration with IT and the Business Division, the Instructional Leaders Team was provided with the names of students who were within 90% of finishing their degrees or certificates. The NSD Deans provided this data to department chairs who then began to contact students directly to let them know that they were very close to finishing and that courses were available for them. This was a conscious, targeted effort to personally reach out to those students who so close to completion. We anticipate a bump in awards as we return to campus.

AWARDS:

2018-19: 443
2019-20: 266
2020-21: 341

UNIT ACCOMPLISHMENTS AND CRITICAL DECISIONS:

Below are a few highlights from each of the units. Common themes center around the Division's response to transitioning to a mostly online service to students. Given that lab experience is a crucial part of our curriculum, finding a way to give students quality remote lab work was a huge challenge. Through the hard work of faculty, staff, and dedicated students, we utilized nearly \$500,000 of CARES Act funds to provide the best possible take home lab kits. The remote lab kits have allowed Mt. SAC to offer classes we otherwise couldn't have, and have helped make some of our online classes a much richer experience than any of us thought was possible. Transitioning back to on campus this Fall semester will be equally challenging. While many of the faculty are eager to get back into the classroom, the Math department still has many reservations. To address some of their concerns, Dean Judd and Associate Dean Vitullo attending one of their department meetings. Faculty members had the opportunity to share their feelings, ask questions, and learn more about what the college is doing to make sure that the compass will be as safe as possible for their return.

AGRICULTURAL SCIENCES

Summary of Notable Achievements:

- Converted many classes to online
- Many faculty SPOT certified
- Created a Canvas environment for the Horticulture Club to allow for student interaction to continue in the online environment

Program Planning (Equity, Retention, and Success):

- Created a survey through Perkins funding to identify barriers to student success and determine student needs.

External and Internal Conditions Analysis:

- AVMA requirements prevent us from offering some lab courses online because in person skill demonstration is required.
- Health requirements limited the ability to have work experience students work on the farm to maintain plant and animal crops, which reduced the available labor force.

Critical Decisions Made by Unit:

- Decided which courses could effectively be offered in an online format.
- Prioritized courses for the return to campus.

- Made difficult decisions about crop production and reduction based on projected sales and course offerings in the COVID environment.

BIOLOGICAL SCIENCES

Summary of Notable Achievements:

- Craig Petersen was recognized with the Eternal Flame Award. Craig retired at the end of 2019-2020 school year, his 43rd year of service.
- HT program went through accreditation in 2019-2020. Our self-study report was submitted fall of 2019. Site visit was originally scheduled for March 2021 but we ended up have a virtual site visit on 6/29. We were awarded 10 years accreditation, the maximum allowed, with annual reports.
- Developed take home kits for Anat 35, Bio 1, Bio 8, Bio 34L, and Micro 22 in order to allow these labs to be effectively taught in the online environment. Though many contributed, these faculty stand out for their contributions here: Anat 35 Melissa Presch Bio 1 Karyn Kakiba-Russell and Tyler Flisik, and Micro 22 Carmen Rexach. Then in the assembly and distribution of these kits, we need to recognize our outstanding lab techs Donna Lee, Ana Jara de Araya, Naomi Velarde-Jang, and Sabrina Torres. Assembling over 1000 kits per semester and distributing kits for multiple different courses is a logistical nightmare and our lab techs made this possible.

Program Planning (Equity, Retention, and Success):

- Participated in extensive discussions about equity in our hiring practices, and are continuing these discussions.
- We continue to have retirements each year, with Craig Petersen retiring last year and Karyn Kakiba-Russell retiring this year. Replacing these FT faculty is a priority for our programs.
- Created a pilot program planned for Fall of continuing to offer some sections of Micro 22 with take-home kits and online classes. If this is successful it allows us to offer 2 more sections of this high demand course, and in a hybrid format that may be more convenient for some students over a fully in person format.

External and Internal Conditions Analysis:

- We are looking forward to the return to campus. This will allow these courses to resume being offered: Bio 2, Anth 4, Anat 40A/40B, Bio 6L (not offered in Fall 2021 due to staffing and lingering concerns about field sites not being open).

Critical Decisions Made by Unit:

- Offered take-home kits in Bio 1, Bio 8, Bio 34L, Anat 35, and Micro 22 to allow these labs to be taught effectively in the online environment.
- Purchased software for Anat 10A and Anat 35 to help teach these classes in the online environment.
- Decided not to offer Anat 40A/40B, Anth 4, Bio 2, and Bio 6L as these could not be taught effectively in the online environment. Anat 40A/40B, Anth 4 and Bio 2 are returning to our Fall 2021 offerings. We hope to offer Bio 6L in Spring 2022.

CHEMISTRY

Summary of Notable Achievements:

- Successful transition during COVID to online labs for all of our courses, over 70 sections
- Creation and distribution of lab kits for Chem 40, and partial kits for some other courses
- Two large grants in the department. 1) An NSF-ATE grant for \$953,000 for "Preparing a Skilled technical Workforce Through Utilization and Assessment of undergraduate Research", 2) "Improving Learning Outcomes for All General Chemistry Students through Adaptive Hybrid Courses", a multiple campus grant spanning community colleges, CSU, and UC)

Program Planning (Equity, Retention, and Success):

- Successfully submitted Chem 55 (Chemistry for Engineers) which is going through the state-level approval process. This will significantly alter our general chemistry sequence, splitting off some of the students currently in Chem 50 and Chem 51 into this other course.
- Submitted an AS-T in chemistry as a new program.

External and Internal Conditions Analysis:

- A worldwide pandemic resulted in students who may have taken up to three semesters of chemistry without having done any significant laboratory work. This means that when we return in Fall 2021 to campus, there will be students in upper-level courses without any experience in hands-on lab work. The department is considering ways of modifying in-class curriculum

to meet those needs as well as partnering with non-credit to offer lab bootcamp.

Critical Decisions Made by Unit:

- Decided to offer all lab-based courses online, creating a segment of students with little to no hands-on laboratory experience.

EARTH SCIENCES & ASTRONOMY

(Since these sections were not required this year at the unit level, ESA did not complete.)

MATHEMATICS AND COMPUTER SCIENCE

Summary of Notable Achievements:

- Martha Hall joined the Math & Computer Science Department from the LERN Department. This brought the number of full-time faculty to 44 for the 2020-2021 academic year.
- Lisa Morales received CARES Act funding to purchase 500 licenses for Padlet.
- Baochi Nguyen, Krysten DeWilde, and Jimmy Tamayo attended the 3rd Bi-Annual Equity Summit hosted by Skyline College. This conference focused on addressing equity issues affecting students in the STEM fields.
- Social distance guidelines continue to be a concern for math and computer science faculty as the College begins plans to reopen the campus for face-to-face classes in Fall 2021.
- A Faculty Webpage Committee was formed to inform students about details of their courses before they enroll.

Program Planning (Equity, Retention, and Success):

- A department equity committee was formed in order to address issues of equity. The committee proposed a revision to the Math Department Exam Policy in order to provide different methods of assessment in an effort to address issues of equity. The committee will be looking into other aspects, such as zero-cost textbooks, additional math resources, messaging, and other equity-related ideas.
- Due to COVID-19, retention has been a minor issue. This is most likely due to external student factors, such as health, work, and family. It is also likely that the late withdrawal date with an excused withdrawal has caused an increase of students staying enrolled up until the last week of the course.

External and Internal Conditions Analysis:

- Total number of credit sections (MATH + CS) reached 757 for 2020-2021 (Summer/Fall/Winter/Spring)
- MATH 285 was offered again in response to demand for combined Linear Algebra and Differential Equations course for engineers.
- The California Acceleration Project's memo which gave data on equity and on our remedial math course offerings.
- Increasing demand for transfer-level math courses and decreasing demand for LERN 48, LERN 49, MATH 50, MATH 51, and MATH 71.
- Increasing demand for computer science courses.

Critical Decisions Made by Unit:

- Department voted to have all MATH and CSCI courses listed as Fully Online and Partially Online Distance Learning in anticipation for return to campus in Fall 2021.
- Decision to offer a variety of online options for Fall 2021: fully online, online instructions with on-campus exams, and hybrid courses.
- New corequisite courses, MATH 10A and MATH 18B, were approved. MATH 18 was approved to be renumbered to MATH 18A.
- CSCI courses increased in sections in part to the fact that there was no limitation to the CS Lab's use. A decision was made by Matt Judd, John Vitullo, and Jimmy Tamayo to use 61-3311 part-time to accommodate the increase in the number of sections.

PHYSICS & ENGINEERING

Summary of Notable Achievements:

- Experienced a 9% growth from 120 sections offered in 19/20 to 131 sections offered in 20/21.
- Sixteen new Engineering programs have been approved by the regional consortia. Of these 11 programs have been

approved by EDC and are on the C & I agenda. So, the department plans to offer 12 certificates and 5 associate degrees in Engineering Applications in Fall 2021.

- Over 400 lab kits were distributed in Fall 2020 and over 550 lab kits were distributed in Spring 2021.
- The department has continued work with the NSF project (ATE Grant). The goals the department is working towards with this grant are:

--to incorporate workplace relevant skills in the curriculum,

--to successfully orient, retain and matriculate students from underserved populations,

--to create clear pathways to career and to 4-year degrees for engineering technology students.

Program Planning (Equity, Retention, and Success):

- The department has chosen to increase the accessibility of the Physics 2AG lab books by printing them and distributing them to hundreds of students.
- For PHYS 4C, CARES funding was used to the purchase lab equipment so that students could perform at-home experiments on wave optics, spectroscopy, buoyancy, sound wave resonance, and nuclear physics.
- The Engineering Summer Cohort (ESC) program, funded by the NSF Advancing Technical Education (ATE) 3-year grant, will have its inaugural offering in Summer 2021.

External and Internal Conditions Analysis:

- The department does not have enough space in lab rooms to teach the number of classes that students need. While classes were online, there were more sections offered.
- Naming conflicts have delayed the approval of Engineering Degrees and Certificates, but the department hopes to offer 12 certificates and 5 associate degrees in Engineering Applications in Fall 2021.
- The Engineering side of the department has been working hard on the NSF/ATE Grant to develop a framework to retain and matriculate students from underserved populations.

Critical Decisions Made by Unit:

- The department has decided to offer the full load of classes once we return to campus, even though the single Lab Technician cannot possibly support all these classes. The department continues to need an additional Lab Technician.
- The department has chosen to offer classes beyond the room availability while online. Unfortunately, this means that the class offerings will need to be reduced with the return to campus.
- The department had opted to continue to grow the Engineering offerings, despite space and staffing limitations. ENGR 285 will be offered in Fall 2021. ENGR 16 is seeking approval to be offered in Spring 2022. There should be 12 certificates and 5 associate degrees in Engineering Applications offered in 2021/2022.
- The department has continued to work on the NSF project and the California Learning Lab project. These grants will help develop programs and framework to help all students, including underserved populations.