Year-Round Task Force Report
February 14, 2020

Overview

The Year-Round Operations Task Force has been charged by the President's Office to examine the opportunities and costs of expanding Cal Poly's operations. The task force formed three Action Teams to examine Curriculum/Concept, Budget, and Operational Continuity. Each of these Action Teams identified and articulated information and insights that would indicate how year-round operations would affect the campus. Year-round operations hold out a number of potential benefits for Cal Poly, the California State University System, current and prospective students, and other stakeholders. Moving to year-round operations also poses substantial costs, challenges, and potential unintended consequences, which range from several currently unknown financial costs to potential unintended effects on admissions, operations, and staffing.

Contents

1. Statement of Principles

Our working assumption has been that any version of YRO would have to be consistent with these values:

1. Cal Poly will maintain its current, high standards for admission and graduation.
2. Continuous improvement of diversity, equity, and inclusion on campus remains of paramount importance.
3. Current faculty and staff workloads will be maintained or improved, as will tenure-density. No faculty will be required to teach four quarters in an academic year against their preference.
4. Graduation rates and eliminating opportunity gaps will continue to improve.
5. The maintenance and improvement of our physical facilities will continue at current levels or better.
6. Summer quarter would be funded through state support.

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2. Summary of Potential Benefits

More Efficient Use of Facilities – One obvious benefit of YRO is that Cal Poly has considerable capital assets (residence halls, classrooms, labs, dining facilities) that are not being used to capacity during the summer months. Running a more substantial academic program during the summer would increase the utilization of these facilities, thus making more efficient use of our resources.

Serving More Students – Adding a full summer quarter would, in principle, allow Cal Poly to grow enrollment by up to one-third of the current total without ever having more than the current total on campus in any quarter. Thus we would be able to serve more California students.

Improving Graduation Rates – If Cal Poly were to grow total enrollment by less than one-third, some of the additional capacity could be used by students who wish to take classes year-round to graduate more quickly. This should improve overall graduation rates. This would be particularly beneficial to first-time freshman (FTF) who matriculate with a significant amount of advanced placement credit, who could use summer term to complete their baccalaureate degree in three years.

Making More High-Impact Educational Practice Experiences Available to Students – If students are enrolled in summer courses, they may opt (or be required) to take a traditional-academic-year quarter off campus, during which they could participate in an HIEP, such as study abroad, an internship, a coop or work experience, and so on.

Opportunities for Additional Compensation / Greater Flexibility for Faculty – Cal Poly faculty currently have relatively limited options for teaching in addition to their contract obligations. YRO would create substantially more opportunities, and may also create faculty schedule flexibility, which may make it possible for faculty to take advantage of research, sabbatical, study-abroad, and other opportunities that would be less available during the traditional academic year.

Scalability of Year-Round Operations: Shifting to year-round operations could be accomplished through a selection of pilot academic programs and gradually increased over time.

Increasing Cal Poly Revenues – We assume that any expansion of FTES for YRO would be funded by the CSU system, and that Cal Poly would enroll additional non-resident students at their current proportion. The CA students either merely pay for themselves or actually cost more to educate than the per-FTE appropriation, but the additional non-resident students would generate new revenues that could be used to fund operations.

3. Summary of Potential Costs

Possible Overcrowding – If overall enrollment is increased, there is the danger that we will end up with too many students on campus, especially during fall quarter. The task force believes that Cal Poly is already operating beyond its capacity during fall quarter, and that adding more FTES is potentially disastrous.

Uneven Depth of Applicant Pools – Only some majors have large numbers of applicants who are currently not being admitted but whose qualifications are similar to those of applicants who are admitted. For many majors, admitting enough students to achieve a 10 or 15% increase in FTES would significantly change the profile of the incoming class for that major.

Changes in Relative Sizes of Majors / Colleges – Since only some majors have the applicant pool depth to expand without degradation in quality of the admitted students, it seems very unlikely that YRO could involve an across-the-board enrollment increase. Instead, it seems much more likely that only some majors could grow, which would change the relative sizes of majors and colleges. That isn't necessarily a bad thing, but it may have unforeseen consequences and requires careful study.

Uneven Demographic Distributions of Applicant/Yield Pools – Based on current admissions data, in some but not all majors, if we were to admit enough students to yield a 10-15% increase in FTES, those additional students would be less diverse than the students we are currently admitting.

Likely Narrowing / Skewing of Applicant / Yield Pools – To avoid the overcrowding problems mentioned above, it seems very likely that Cal Poly would need to require students to attend during some summer quarters and to be off campus for some traditional-academic-year quarters. Although we cannot be certain without market research, it seems likely that such requirements would have the effect of raising the perceived "cost" of choosing Cal Poly, as students consider possible consequences of this unusual schedule (disruption of summer employment, difficulties with off-campus housing leases, the danger of not being able to secure an adequate or appropriate internship during a traditional academic-year quarter, etc.). This seems especially likely if YRO involves changing a first-year student's starting quarter. Supply and demand theory suggests that raising the (perceived) cost of attending Cal Poly will result in a drop in demand, thus possibly reducing both applicants and yield rates, as would-be students choose competitor schools instead. Further, such changes should in principle be influenced by a would-be applicant's "elasticity"—that is, how easily they could manage the financial, social, or other challenges associated with the higher "costs" of attendance. Generally, students with higher household wealth and/or from socially privileged backgrounds are likely to have higher "elasticity," such that the applicant and yield pools seem likely to skew wealthier and toward more privileged groups.

Possible Narrowing / Skewing of Staff and Faculty Applicant Pools – The same point as above, but with regard to faculty and staff who may see an unusual schedule as a negative of Cal Poly as an employer.

Increased Difficulty for Current Students to Change Majors: Change-of-Major students are a large part of many departments' growth, especially highly impacted academic programs. If the university is to grow enrollment through first-time freshmen (FTF), there may be a need to further restrict or eliminate internal transfers into the most highly

impacted programs. This will limit the flexibility of students who determine they chose the wrong major after enrolling at Cal Poly. This inability to change majors could also have a negative effect on prospective students.

Capital and Infrastructure Costs – Enrollment growth would lead to certain but currently unknowable capital costs. Currently, much of the infrastructure around Cal Poly is aging, including facilities and information technology. The campus Information Technology Services division has indicated through the 5-year plan process the need for approximately $61M to address deferred maintenance on the physical, wireless, and outdoor networks, classroom modernization and facility needs for the Cloud Gateways and ITS staff. Both growth in student enrollment and the steady increase of the number of devices each student connects to the network will have a significant impact on network services if maintenance deferment continues. The housing portfolio is still original infrastructure for buildings from the 1950s and 1970s. The university has an estimated $200M in major renovations and $69M in deferred maintenance. Similarly, some units (e.g. Financial Aid) are currently using their allotted space at 100% capacity, and adding staff would require the unit to relocate or split staff between locations. Expanding summer operations would put additional demand on both facilities and finances.

Loss / Reduction of Summer Uses of Campus / Staff – YRO would impact the current summer uses of campus, for example for camps (EPIC), trainings (CPPD), project work (AFD), maintenance (Facilities and Housing), and so on.

Uneven Distribution of Work During the Academic Year – The work done by both faculty and staff is not evenly distributed throughout the traditional academic year. For example, tenure-line faculty who are in residence during fall quarter take on a substantial service burden related to the RPT process. Faculty who elect to teach in summer and take the fall off would face a significantly reduced service burden, compared to colleagues who elect to teach in the fall quarter. The task force expects that there are similar uneven distributions in other areas, which could result in significant inequities.

Increased Operating Costs – In addition to the obvious proportionate increases for things like electricity, water, and so on, there are some costs that are tied directly to FTES (library database subscriptions), that would require renegotiation of existing contracts (public transit, fire protection services), or that we currently avoid (lack of air conditioning in some buildings).

4. Proposed Next Steps

Given the significant uncertainty about YRO, the Task Force recommends the following next steps:

a) That any YRO initiative be treated as a pilot program, to be renewed, expanded, scaled back or canceled as we get a better understanding of its effects.

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b) That any YRO initiative start small, with the expectation that it will be scaled up if it is successful.

c) That the university conduct market research to model the likely effect of both small-scale and larger versions of YRO.

d) That once market research is available, a concrete model for YRO should be developed, including the number of additional FTES, which departments those would affect, and how unintentional over-enrollment in fall quarter would be avoided. Using that model, a complete financial projection should be assembled.

5. Operational Continuity Workgroup Report

Categories of Impact by Impact Area
1. Critical / Potentially Critical
Defined as immediate action to correct a situation; or the situation, if not corrected expeditiously, will become critical. (0 to 12 months)

Staffing

- There will be an increase in operational demand across the organization that will impact the hours of need for staff and services. As this effort progresses, this will need to be addressed in detail. The extent of the impact depends on the programmatic implementation of year-round and how many students will live on-campus in the fourth quarter. Examples of areas of impact include an increase in the hours the library is open, extending hours of technical support to classrooms/help desk, staff to address alarms (fire, elevators, etc. monitoring and response), custodial / maintenance, mental health and safety, dining, parking, etc.
- There are a number of employees across the institution that are on contract for less than 12 months a year. The contract terms will need to be adjusted or additional staff hired. Additionally, funding to support student employees would need to be increased to include the student employees that would need to be hired for the fourth quarter.
- Analyze the impacts to recruit/onboard students and faculty/staff in larger numbers each quarter and assess how this can be accomplished.
- Scheduling for campus welcome events (open house, SLO Days, move-in, and WOW) may be affected by Year-Round Operations and may need to be adjusted.
- Reimagine staff wellbeing needs in terms of workload, vacations, flex time, etc., especially if evening and weekend commitments increase and there is not a summer to regroup.
- Estimated 5%-15% increase in facility staffing specifically in areas of custodial and maintenance crews for both offices and classrooms.

Space

- Available Space: Should additional faculty and staff be hired, consideration of the space requirements will be necessary. A combined approach of utilizing space differently, working remotely, and adding space could be used to address the need.

- Space Usage: A detailed use evaluation & scheduling of campus spaces during the year will need to occur and those schedules will need to be available for use by the campus at-large.

Utilities

- Instruction for Cal Poly that is conducted at off-site locations has implications for networking- those implications depend on what services are expected to be delivered off of campus. Potentially also impacts security services (VPN, Multi-factor authentication).
- Due to higher likelihood of power outages to prevent fire, review and improvement of power generation infrastructure should occur to assure essential services continue in an outage.
- Operating expenses would increase for utilities, supplies, copies, and more.
- Projects involving utilities/infrastructure will need detailed planning and scheduling. Quality long term project planning will be required.

Services

- Ensure adequate staff in offices to provide academic support, hazardous waste, lab safety, student clubs, disability services, etc. to manage faculty and student services.
- Assess dining services for impacts/challenges with a more robust summer quarter.
- Ensure financial aid commitment for students during summer quarter.
- Ensure continued access to childcare during the summer period.
- Identify the impact on summer conference groups.

Projects

- Maintenance, repairs, deep cleaning, office renovations, upgrades and/or refresh projects are often carried out during summer term for physical spaces, infrastructure, and software. Procedures and schedules will need to be established that will allow maintenance activities to occur throughout the year and communication and coordination across divisions will be required.

2. Necessary

Defined as This includes actions to preclude predictable situations. These items should be addressed within the next (12 to 24 months).

Staffing

- May need to move facilities operations staff resources to Evening / Night / Weekend shifts.

Space

- Classroom / Building "use rotation" may be required to perform maintenance and project improvement work.

Utilities

- Increased supplies and services costs based on Summer demand (Est 10%-20%).
- Coordinate a revised schedule for fire protection system testing within residential units and academic classroom buildings.

- In the transition to AWS's pay-as-you-go model, we may incur additional AWS usage charges for services we would not normally consume or consume to the same extent during the summer.
- Parking lot maintenance usually occurs over the summer months and would need to be accounted for in year-round scheduling.

Services

- Database and journal subscriptions in the library and software licensing cost will increase as enrollment increases (for anything licensed for the whole institution or by student count). Must forecast enrollment to prepare for licensing cost increases.
- With a lot of aging housing stock, there is a concern for a catastrophic failure by using most rooms year-round without doing major infrastructure renovations.
- Cal Poly subsidizes SLO transit for all students, faculty and staff. With lower service needs during the summer months, we have agreed to a reduction in service at those times. Adding a summer quarter would result in renegotiating this service.
- RTA Bus passes would most likely also need to be increased.
- The current three-year agreement with SLO fire to provide services would need a re-negotiation as the current contract reflects a decrease in service levels during summer months.
- Safety Escort Van services are not offered in the summer. We would need to fund an extra quarter of services.
- Counselors are mostly 9 months – and the fee model is built around that level of staffing. A substantial increase in the health fee would need to be provided if there weren't state resources to cover the increased salary costs.
- Similarly, University Union (UU) fees would need to increase to cover the wages of students and staff who keep the facilities going in the UU and Recreation Center.

Projects

- Year-round operations may surface new IT project demand around existing systems such as PeopleSoft, or may further increase desire for CRM, new data analytics capabilities, etc. These efforts would require appropriate additional funding.
- Space availability may cause more phasing of projects, cost and schedule impacts.
- Increased focus on project impact on academics. (Sound, Safety, Environmental).

Other

- Many students cannot take winter or spring quarter off with the typical 12-month lease that is offered in the area. A study would need to be conducted on how the local housing market would affect students in a YRO environment.
- Industrial air conditioners and solar window film to cool / keep cool buildings without air conditioning.

3. Recommended

Defined as sensible improvements to the current situation. These are not required for the most basic function but improve overall usability and can lower maintenance costs.

Staffing

- Understand impacts on academic advising during the summer quarter.

Space

- May require broader review and analysis of campus academic breaks to provide greater accessibility to space to perform maintenance/project work.

Other

- Review the student onboarding and commencement process to ensure sustainability for staff and the local community.

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6. Enrollment Model Working Group

The big piece that is missing is the capital costs and construction and that requires more time to investigate. We have ideas on how to do this, but it gets into the weeds on CSU space modeling and is probably not appropriate at this point.

Here are some items on how to think about this:

> The actual non-capital cost of any additional growth is independent of YRO. The idea is we are delivering additional SCUs and those cost a certain amount. The financial model we have been building takes a stab at this part.
>
> This growth requires a certain amount of new facilities. The amount of new facilities is directly dependent on our "summer efficiency" - that is, the percent of overall CY FTES growth we can deliver in the summer.
>
> Succinctly, YRO decreases the quantity and pace that facilities need to be brought online - think of efficiency between 0-100% of full YRO.

Complicating matters here is that the CSU YRO planning documents going back to 2000 only envision a rural campus like Cal Poly delivering at most 25% of the theoretical maximum FTES that could be delivered in the summer. For an urban campus this is 40%. So 100% YRO means delivering 25% of the theoretical max FTES in summer. Right now, we are at 20% YRO (5% theoretical max) assuming self-support summer is moved to state side. We do not have to agree with the 25% cap on rural campus YRO delivery and so summer efficiency could theoretically go from 0-400%.

For perspective, with the Frost center and library renovation complete and running at 100% YRO efficiency as described above, a funded resident CY FTES level of 17,275 (current) and 3,100 non-resident (a little less than current) will incur no additional needed facilities according to CSU capacity calculations. The reason we are jammed up now is that we do not use summer efficiently. We are delivering our FTE during Fall, Winter and Spring alone. Given this, it will likely be difficult to make the argument for more funding from the CSU (for enrollment and/or capital projects) until we reach this level of summer enrollment. The CSU funds a CY FTES (which assumes some summer delivery), and as such the money we get per student is independent of quarters in which the instruction occurs

7. Department Year-Round Operations Curriculum Modeling

The Action Team on Curriculum and Concept asked participating department heads and chairs to generate potential models on how year-round operations would affect their respective curricula as well as their staffing and other infrastructure and capital requirements. The following three programs—Psychology and Child Development, Computer Science and Software Engineering, and Mechanical Engineering—have created models that incorporate year-round operations. These models are included in this report as representative examples of how year-round operations could work. Nevertheless, they have not been subject to review or approved by their respective faculties or college administrations, nor has any consultative process been undertaken to determine whether they should be considered pilot programs for year-round operations. They should be understood as illustrations, not as proposals.

7a. Potential Year-Round Operations for the Psychology and Child Development Department

Department Overview:
The Psychology and Child Development Department (PSYCD) is 1 of 16 departments in the College of Liberal Arts (CLA). Our department has the largest number of undergraduate majors and is one of only four departments in the college that offers a graduate program which is also the largest program. We also provide two unique services to Cal Poly and the broader community: a high quality full-day preschool and a counseling clinic that provides services for individuals, couples, and/or families.

The PSYCD department serves two majors (PSY & CD), three minors (PSY, CD and Gerontology), and a Master's program. In fact, we offer the highest number of minors at Cal Poly. The department also offers several GE and USCP courses and provides required support courses for other majors throughout Cal Poly. Our department has the largest number of undergraduate applicants in the CLA. Applicants to our department are some of the highest achieving applicants to the college, as indicated by their high school or entering GPAs and achievement scores. Our students begin strong and end strong in our programs--many of our graduates enroll in highly competitive graduate programs; several alumni are now faculty at various universities. Others secure excellent positions in the workforce.

Our students are taught by highly accomplished faculty who maintain a high level of teaching excellence while they remain actively engaged in research and other professional activities (our faculty are highly represented among college and university award recipients). And we are proud to highlight that we are leaders in supporting diversity and inclusion on campus. Tables 1 and 2 provide a snapshot of our current numbers.

Snapshot of our current numbers:

Table 1. Number of Faculty AY19-20

Headcount	Psychology	Child Development	PSY MS
Tenure-line	10	6	3
Emeritus/FERP	3	0	1
Part time Lecturers	16	6	2

*Note that a number of our faculty teach in more than one program.

Table 2. Number of Enrolled Students in AY19-20

	Psychology	Child Development	PSY MS
Majors	368	178	36
Minors	330 (+7 Gerontology minors)	105	NA

Snapshot of our services

Preschool Learning Lab: The Preschool Learning Lab (PLL) is a high-quality preschool program for children between the ages of 3 and 5 years. The PLL is a quintessential Learn-by-Doing laboratory that not only provides students, faculty and staff with countless teaching, research and design opportunities but also serves the campus community through high-quality early childhood care and instruction. The PLL expanded operations in 2012 to become a full-day inquiry-based early learning program for ~30 children. One of the core requirements of the CD major is that students gain authentic experiences working with young children in the PLL. The PLL staff includes a director, two master teachers and a number of student assistants. The PLL advisory board includes the child development tenure-line faculty. The university is currently considering expanding the PLL.

San Luis Obispo Counseling Service at Cal Poly: Students in our Master's program provide sort-term counseling and consultation services, under the supervision of our licensed graduate program faculty for San Luis Obispo County residents who do not qualify for mental health services or who cannot afford private psychotherapy. The clinic is located in a suite of rooms in Building 2 on campus. A graduate program faculty member serves as clinic director and two grad students serve as clinic assistants.

Enrollment Trends:
The number of applications to our programs has increased overtime. Our SCU production has increased due to the increasing number of majors and minors we serve. This includes the large number of internal change of major transfers. The Tables and Figures below document these trends.

B.S. Psychology

First Time Freshmen

	Fall 2013	**Fall 2014**	**Fall 2015**	**Fall 2016**	**Fall 2017**	**Fall 2018**
Applications	1,844	1884	1981	2064	2171	2574
Selected	526	368	391	367	447	425
Selected Percent	28.5%	19.5%	19.7%	17.8%	20.6%	16.5%

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Enrolled	122	84	92	65	98	61
PSY Yield	23.2%	22.8%	23.5%	17.7%	21.9%	14.4%

New Transfers

	Fall 2013	**Fall 2014**	**Fall 2015**	**Fall 2016**	**Fall 2017**	**Fall 2018**
Applications	579	592	550	579	512	781
Selected	98	54	51	46	55	47
Selected Percent	16.9%	9.1%	9.3%	7.9%	10.7%	6.0%
Enrolled	48	22	20	20	28	28
Yield	49.0%	40.7%	39.2%	43.5%	50.9%	59.6%

B.S. Child Development

First Time Freshmen

	Fall 2013	**Fall 2014**	**Fall 2015**	**Fall 2016**	**Fall 2017**	**Fall 2018**
Applications	398	462	503	469	495	546
Selected	163	95	116	156	135	124
Selected Percent	41.0%	20.6%	23.1%	33.3%	27.3%	22.7%
Enrolled	71	35	42	57	51	24
CD Yield	43.6%	36.8%	36.2%	36.5%	37.8%	19.4%

New Transfers

	Fall 2013	**Fall 2014**	**Fall 2015**	**Fall 2016**	**Fall 2017**	**Fall 2018**
Applications	127	124	117	130	130	171
Selected	60	36	37	30	15	19
Selected Percent	47.2%	29.0%	31.6%	23.1%	11.5%	11.1%
Enrolled	24	27	23	23	11	15
Yield	40.0%	75.0%	62.2%	76.7%	73.3%	78.9B.S%

M.S. Psychology

	Fall 2013	**Fall 2014**	**Fall 2015**	**Fall 2016**	**Fall 2017**	**Fall 2018**
Applications	57	54	60	51	60	79
Selected	19	14	19	27	28	25
Selected Percent	33.3%	25.9%	31.7%	52.9%	46.7%	31.6%
Enrolled	18	12	14	14	13	18
MS Yield	94.7%	85.7%	73.7%	51.9%	46.4%	72.0%

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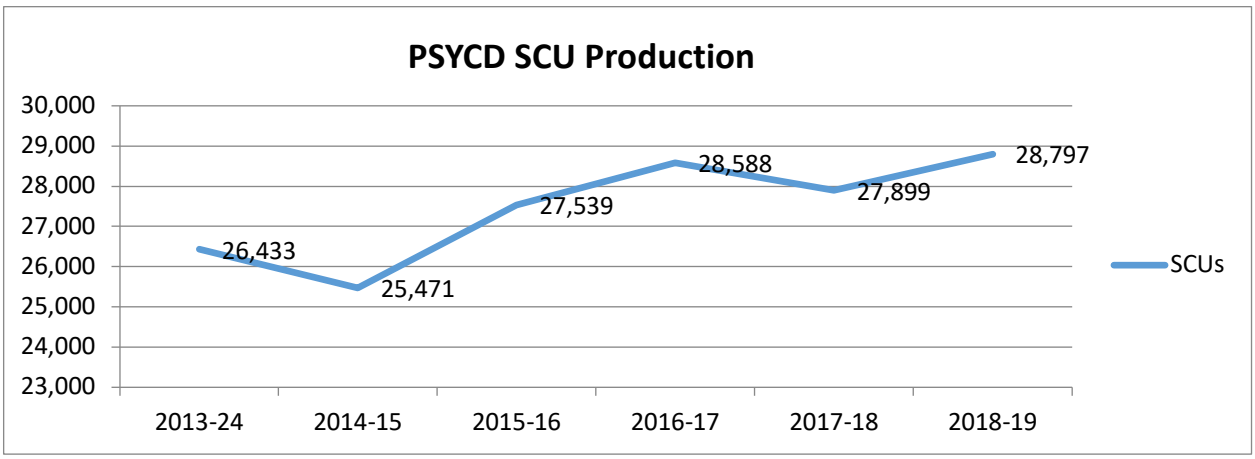

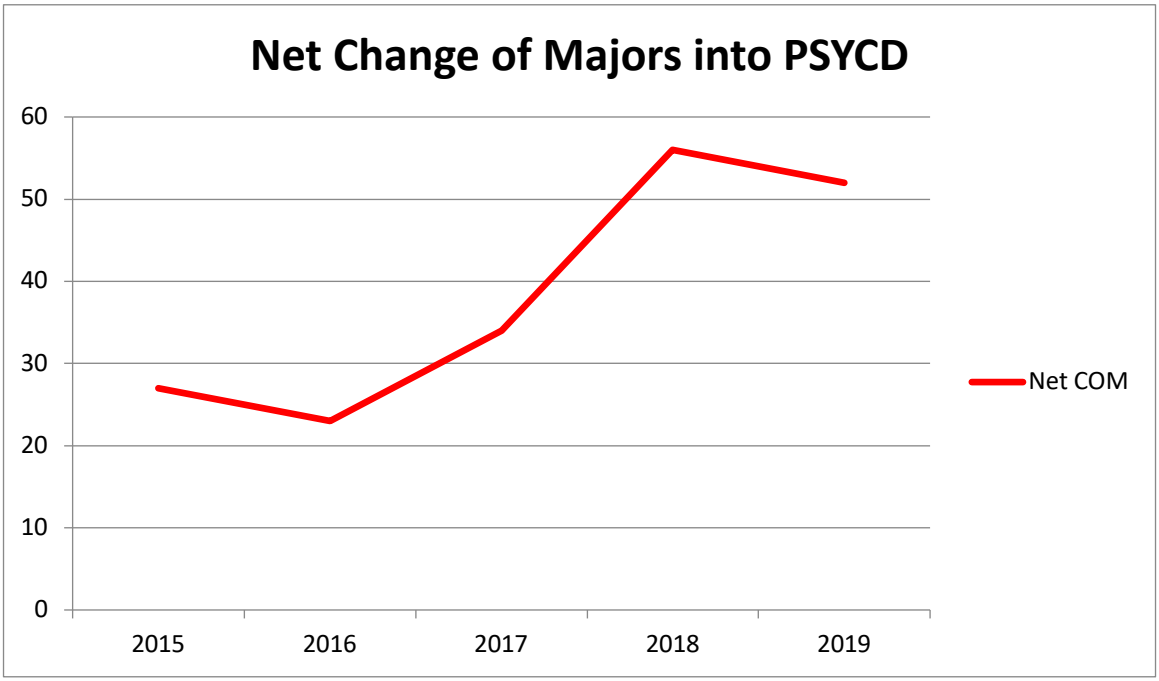

Primary Constraints:

We are now at capacity for our existing facilities. We have our lecturers tripled up in offices and we will soon run out of office space for our tenure-line faculty. Our Preschool Learning Lab, which is integral to our CD curriculum, cannot accommodate more undergraduate students due to licensing regulations (and simply no room for more bodies). Also, a number of our courses require computers. We have one classroom equipped with 20 computers so we are already beyond capacity in scheduling classes in this room. We offer courses from 7 AM to 10 PM most days of the week every quarter.

The primary constraints to increasing enrollment are our facilities and number of faculty. Finding qualified lecturers continues to be a challenge. Any plans to increase enrollment that increases fall, winter, or spring SCU generation will require a corresponding increase in department facilities and faculty.

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As noted above, PSYCD is a net importer of Change of Majors (COM) in the college, and we have an increasing demand for minors, which adds significantly to the total enrollment. To allow for growth from the freshmen application pool, Change of Major policies may need to be tightened or suspended.

Possible Implementation:
The major curricula in PSY and CD are relatively flexible. Required courses are offered every quarter. Remaining requirements are designed to allow students the flexibility to choose from a subset of courses. Courses from each subset are offered every quarter. Assuming all students begin in Fall quarter, we would still be able to offer our PSY and CD orientation courses to all incoming students. The challenge to increasing our enrollment by 25% are the key components of our curricula that either require small class sizes (e.g. PSY323 Helping Relationships class required by both PSY & CD students cannot exceed 21) or particular resources (e.g., CD230 Preschool Lab allows up to 20 students in the preschool lab in any quarter or our Research Methods courses that require a computer lab). Moreover a cornerstone of our two undergraduate programs are our required 2-quarter internships which are done at local community agencies under faculty supervision. The only way we could manage the supervision of an additional 25% enrollment is if we increase the number of tenure-line faculty. Also, an additional challenge to this is ensuring that we continue to have enough internship placements to accommodate more students.

It is difficult to estimate exactly how many additional faculty we would need to accommodate an enrollment growth of 25% because of the large number of students from other majors that enroll in our courses (i.e., will the 25% growth occur broadly or in certain departments). It's also unclear if a Year Round model will allow students flexibility to take a full unit load all four quarters every year or will students be asked to sit out one quarter. **At minimum we would need to add 12 faculty**.

For our students it does not make sense for them to be away from campus in Fall, Winter or Spring. Unlike Engineering majors that have access to industries to support them in co-ops or internships during the traditional academic year, the same is not true for Psychology & Child Development (i.e. there is no specific industry associated with these disciplines). Discussions with our Department Student Advisory Committee suggest that it would be a hardship for our students, particularly low income students, if there were required to leave campus for a quarter. At the moment our Preschool Lab does not operate year round so we need to change this (which would be a cost to the university). Even if we move to a 12-month operation we still would not be able to accommodate a larger enrollment of CD students.

Finally, it is important to emphasize that PSY & CD is committed to ensuring that we attract a diverse applicant pool of highly qualified students. Any change in enrollment structure that would lead to less diverse—both with respect to race/ethnicity and SES—would be strongly opposed by our faculty who have worked very hard to strengthen DEI on our campus.

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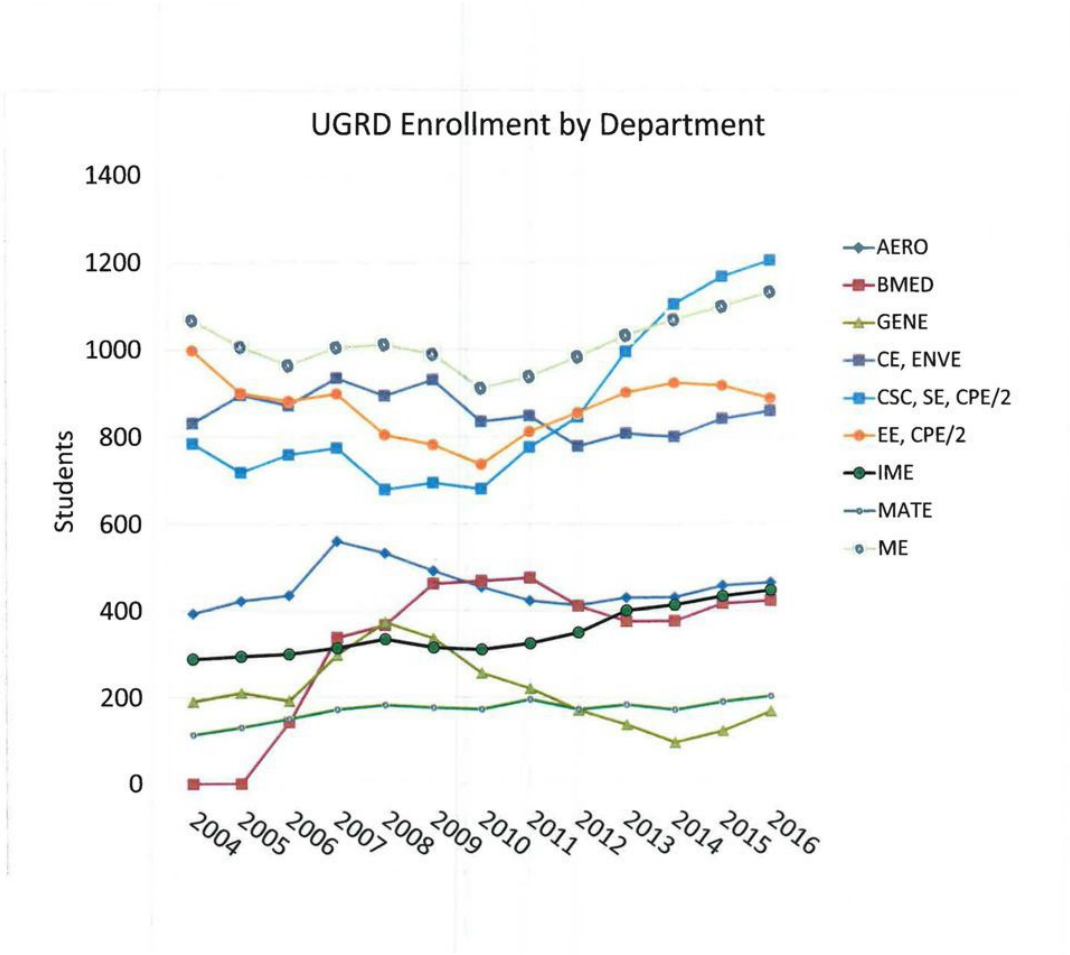
7b. Model for Potential Year-Round Operations for the Computer Science and Software Engineering Department

Primary Goal of YRO: Better serve the State of California by graduating more in-demand Computing professionals in a timely manner and by using existing facilities more efficiently. This could be done by increasing the enrollment in Computer Science, Computer Engineering, and Software Engineering by accepting more qualified students and using the summer quarter more effectively.

Primary Constraints: The CSSE department serves three majors (CSC, SE, and CPE), four minors (CS, Data Science, CIA, and Bioinformatics), a Masters program, and one concentration (Computing for the interactive arts). The department also offers required support courses for several other majors in CENG and throughout Cal Poly. Between 2010 and 2016, enrollment has doubled from ~650 to over 1300 for just our undergraduate majors.



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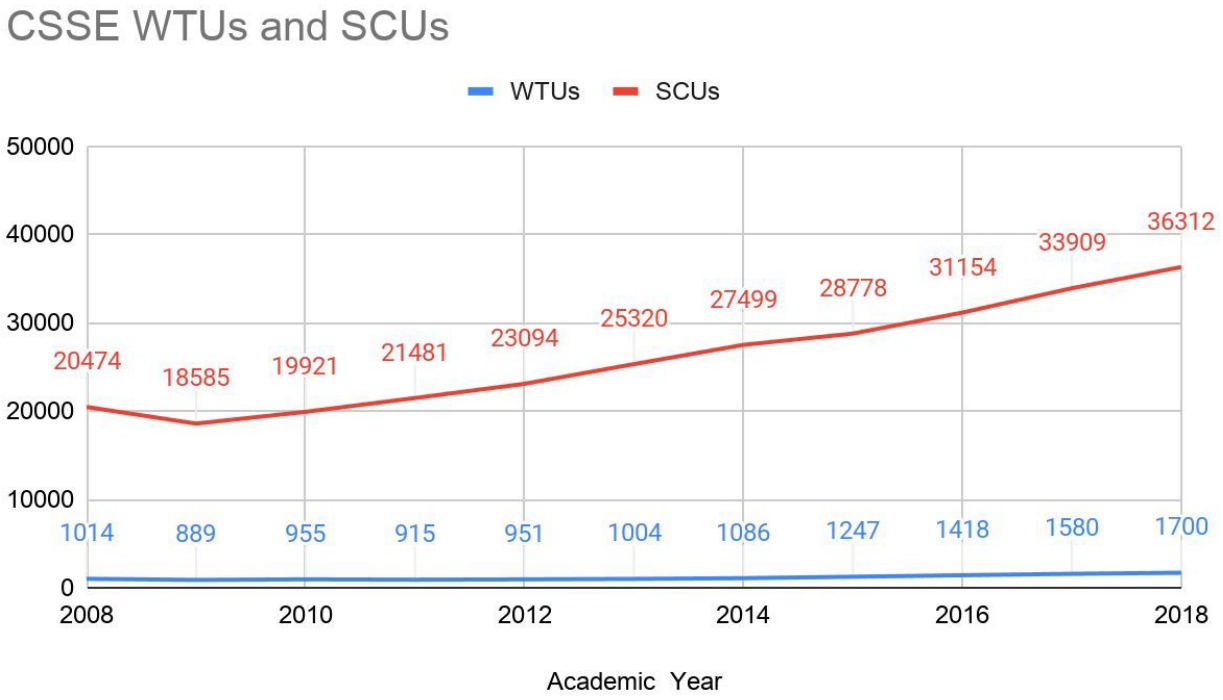
We are now at capacity for our existing facilities. We have faculty doubled and tripled up in offices, we have converted storage closets to offices, and we offer courses from 7 AM to 10 PM most days of the week every quarter.



The primary constraint to increasing enrollment is our facilities and the secondary constraint is finding more qualified instructors. Any plans to increase enrollment that increases fall, winter, or spring SCU
generation will require a corresponding increase in department facilities.

Current Situation: The CSSE department has not significantly deviated in the enrollment targets for the three majors it supports. The exception to this was for Fall of 2018, where we set our targets ~30% lower to account for the large increase in enrollment in Fall 2017. Similar to Mechanical Engineering, Computer Science is a net importer of Change of Majors (COM), and has ever increasing demand for minors, which adds significantly to the total enrollment.

Possible Implementation: The following table shows a possible implementation for the CSC curriculum requirements spread over four quarters, with four distinct cohorts each year, each being gone on average one quarter per year. This has all freshmen start in Fall, but subsequent year's cohorts would be gone during Fall to accommodate for this increase. It's also important to note that this does not include any support courses or GE courses, which would be necessary to keep the students in full-time standing, and satisfy all degree requirements. This would mean that many of these additional courses would also need to be offered in Summer.

	Fall	Winter	Spring	Summer
Year One				
Cohort 1	CSC 123	CSC 101	CSC 202+225	CSC 203
Cohort 2	CSC 123	CSC 101	CSC 202+225	
Cohort 3	CSC 123	CSC 101	CSC 202+225	CSC 203
Cohort 4	CSC 123	CSC 101		CSC 202+225
Year Two				
			CSC 348+357	CSC 315+349
	CSC 203	CSC 348+357		CSC 315+349
		CSC 348+357	CSC 315+349	CSC 300+445
	CSC 203	CSC 348+357	CSC 315+349	
Year Three				
	CSC 300+445		CSC 430+TE	TE+TE
	CSC 300+308	CSC 309+430		TE+TE
		CSC 308+430	CSC 309+TE	TE+TE
	CSC 300+308	CSC 309+430	CSC 445+TE	
Year Four				
		CSC 308+453	CSC 309+491+TE	CSC 492+TE+TE
	CSC 445+TE	CSC 453+491+TE	CSC 492+TE+TE	
			CSC 453+491+TE	CSC 492+TE+TE
	CSC 453+TE	CSC 491+TE+TE	CSC 492+TE+TE	
# Cohorts	11	13	13	11

Needs: With our current instructional facilities and instructors, we are supporting approximately 567 WTUs per quarter, which is theoretically possible to expand into Summer. It's important to recognize that not all of these WTUs are offered to CSC/SE/CPE students. We have significant demand for required courses such as CSC 101 (Math, EE, Stats, etc.) and CSC 231 (ME, ARCE, etc.). If those programs grow as well in response to YRO, that will limit the growth of our majors.

To reach our WTU maximum for Summer, we **must** have additional office space to accommodate the additional instructors that would have to be on-boarded. 567 WTU approximates to **seven full-time lecturers** and **seven tenure-line faculty**, for a total of **14 full-time people**.

7c. Model for Potential Year-Round Operations for the Mechanical Engineering Department

Primary Goal of YRO: Better serve the State of California by graduating more in-demand Mechanical Engineers and use existing facilities more efficiently. This could be done by increasing the enrollment in Mechanical Engineering by accepting more qualified students and using the summer quarter more effectively.

Primary Constraints: As the department enrollment has grown from 940 to over 1200 students since 2011, we are now making maximum use of our facilities during Fall, Winter and Spring Quarters. The primary constraint to increasing enrollment is our facilities and the secondary constraint is finding more qualified instructors. Any plans to increase enrollment that increases fall, winter, or spring SCU generation will require a significant increase in department facilities.

Current Situation:
Since 2011 the M.E. department has set an enrollment target of 180 new FTFs and 32 NTRs (15% of our new students). Additionally, each year the department is a net importer of Change of Majors (COM) which adds significantly to the total enrollment. The actual numbers of FTFs, NTRs, COMs and total enrollment is given in Table 1 below. Note that the average number of new FTFs and NTRs over this period is approximately 21 more than requested and the total new students each year has averaged 282. Note also that total ME enrollment and course demand are both functions of how many students CENG enrolls. More CENG FTFs means more COMs into ME and a greater demand for our service courses (ME211, ME212, ME302 and ME341) in subsequent years. Decoupling and looking at ME enrollment alone is not sufficient to predict impacts on the program for YRO. The following analysis is based on the assumption that only the ME program in CENG would grow. More resources would be necessary if other department that depend on M.E. courses grow as well. This includes AERO, BMED, CE, ENVE, GENE, IME, MFGE, MATE and EE.

Table 1: Actual FTF, NTR, COM, Total enrollments

Year	FTFs	NTR	COM	Total New Students	Total Enrollment
Fall 2019	212	41	29*	282	1210
Fall 2018	178	34	45	257	1213
Fall 2017	201	40	61	302	1219
Fall 2016	195	34	83	312	1135
Fall 2015	185	28	59	272	1101
Fall 2014	185	31	30	246	1071
Fall 2013	240	27	58	325	1034
Fall 2012	184	35	22	241	985
Fall 2011	209	37	54	300	940
Average	**199**	**34**	**52**	**282**	

*2019-2020 COM as of January 26, 2020 – will likely increase!

These numbers were initially set with the goal of increasing Mechanical Engineering Enrollment after it was reduced during the recession of 2007-2009. As expected, the enrollment grew, but perhaps more than anticipated. As seen in Figure 1 below, the enrollment grew at a fast and

steady pace until it finally leveled off at just over 1200 students, two years ago. Unfortunately, this level of student demand is straining our capacity for instructors and facilities as we have run out of reasonable lab times for many of our laboratories and our thermal science laboratory and our computer/design laboratories in particular. This is starting to lower efficiency since undesirable lab times are interfering with students' schedules. As an example, Figure 3 shows the schedule for the Vibrations laboratory. We may need to add a section this spring and the only available time is Friday 3-6. We are not scheduling that because we don't think students will sign up for it. Figure 4 shows the schedule for the Thermal Science lab with many labs going to 9 pm. The inability to find suitable lab times will also limit our ability to further lower our 4-year graduation rates since we cannot meet further student demand if students cannot or will not sign up for courses. Current teaching demands also limits time for faculty scholarship as base teaching loads for tenure track faculty are 12 WTUs quarter and assigned time for advising students on research projects can't be granted if we are to meet student demand. Simultaneously we have not maintained our tenure density as we rapidly increased our course offerings through the use of more part- time lecturers and graduate students.

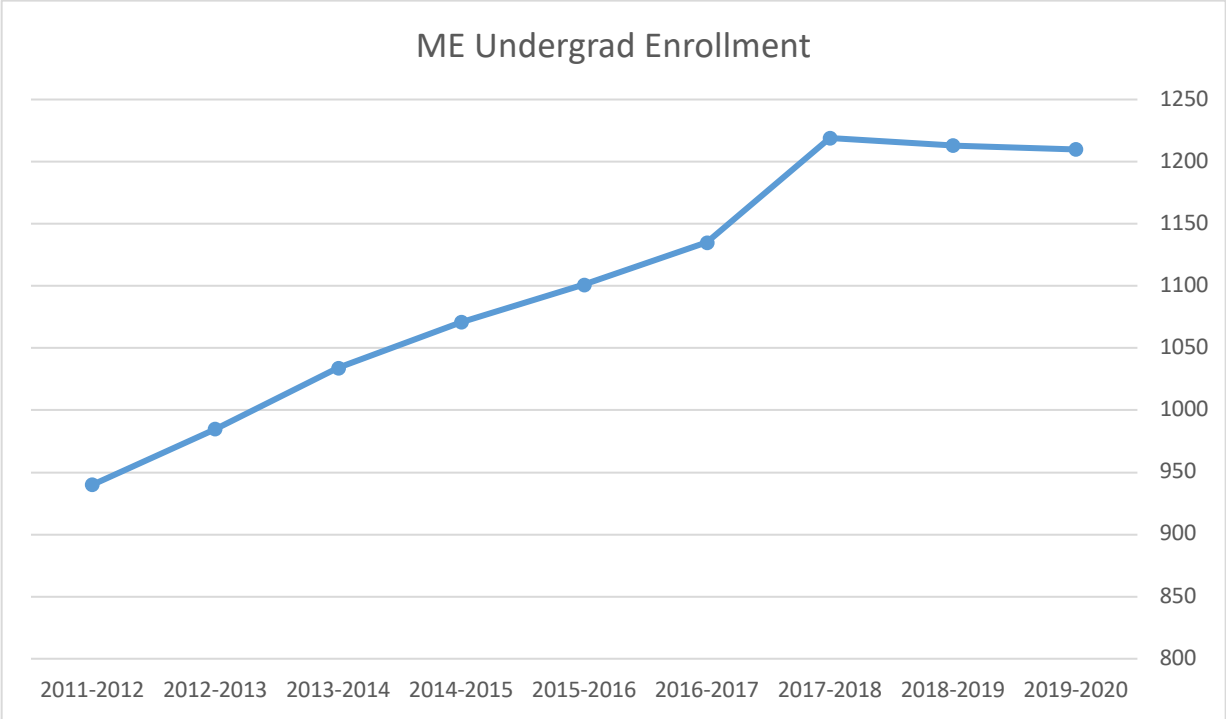


Figure 1: M.E. Undergraduate Enrollment

13-101 **VIBES LAB**

	Monday		Tuesday		Wednesday		Thursday		Friday	
8	318 Noori	No 318 Lab		318 Leitzell	318 Noori	No 318 Lab		318 M. Cooper	318 Noori	No 318 Lab
9	318 Noori				318 Noori				318 Noori	
10	318 Ghalamchi				318 Ghalamchi				318 Ghalamchi	
11	318 Ghalamchi/Wade				318 Ghalamchi/Wade				318 Ghalamchi/Wade	
12		318 Noori		318 Leitzell		318 Noori		318 M. Cooper		318 Espinoza-Wade
1										
2										
3		318 Leitzell		517 HP		318 Leitzell		318 Espinoza-Wade		~~318 Staff~~
4										
5										
6										
7										
8										

Figure 2: Spring Vibrations Lab Schedule

13-203	THERMAL LAB									
	Monday		Tuesday		Wednesday		Thursday		Friday	
7										
8	236	No labs		236 Thorncroft	236	No labs		350 Hontz		236 Ridgely
9	236/350				236/350				350	
10	236/350				236/350				350	
11										
12		350 J Lo		236 Ridgely		350 J Lo		350 Hontz		350 J Lo
1										
2										
3	350	236 Niebhur		236 Ridgely	350	236 Niebhur		350 Mayer	350	236 Niebhur
4	350				350				350	
5										
6		350 McDaniel		350 Staff		350 McDaniel		Lab open		Lab open
7										
8										

Figure 3: Spring Thermal Science Lab Schedule

M.E. Curriculum

The first year of the ME prefix courses in the curriculum represents only four units of coursework and are lockstep. The First year students are primarily taking courses in Math, Science, Manufacturing and GE. All FTFs are block scheduled into the following courses:

Fall: ME128 Lab 1 unit, ME163 seminar 1 unit
Winter: ME129 Lab 1 unit
Spring: ME130 Lab 1 unit

Currently the department offers all required second year and higher course every quarter; therefore, new transfer students take courses depending on their level of credit from their community colleges with the notable exception that they take an introductory bridge course that is only offered in the Fall and Spring. Note that a typical NTR takes four of the five ME second year courses (ME212, ME234, ME236 and ME251), so from the department's perspective they really are second year students who also take third year M.E. courses. Given that we offer every required course every quarter, adding a summer schedule would not have a large impact on M.E. students' paths to graduation since already students take different paths through the curriculum. Lockstep is not an option in Mechanical Engineering because we have too many students to satisfy demand for a single course in any one quarter (unless we run labs at 3 am!). To increase enrollment further through the use of a summer means some students would be required to attend summer in lieu of another quarter.

How Much could we increase with YRO?

If 3/4 of our students attended summer in lieu of another quarter, then we could theoretically have an enrollment of 4/3 the current number (or 1/3 more students) without requiring higher facilities use each quarter. This assumes an equal distribution of students attending each quarter and of those attending each quarter there would be an equal distribution by level (i.e. same numbers of 1st year, 2nd year, 3rd year, 4th year, 5th year). In this ideal situation we could then increase our enrollment by 400 students. Although this is very unlikely to occur, perhaps a goal for the YRO proposal would be a 250 student increase.

Slow Phase in to YRO: Increase by 50 students/year for 5 years.

The Graduation Initiative target for the Mechanical Engineering 4-year graduation rate is 40%. We are currently at 24.6% and increasing and indications are that we can meet our goal. But, we

do need to keep in mind that even with that goal, over half of our students will take longer than four years to graduate, so to increase our enrollment by 250 should be done over 5 years at 50 students/year. We can then fill in for students who graduate in four years with extra transfer students. This could start occurring in year three.

Possible Implementation plan starting Fall 2021:
For Fall 2021, admit 250 FTFs and 32 NTR which represents 50 extra FTFs. Divide the 250 into four groups of 62 students each, call them Groups A, B ,C and D. All FTFs would than attend FWS with minor impact on the Mechanical Engineering department since we would just need to provide them with the introductory courses. This is an increase in 14.6 WTUs for the year and would likely require the addition of a computer laboratory to teach the computer drafting classes. This will impact IME courses and Math, Chemistry, Physics, English and COMs.
At the end of the spring quarter of the first academic year, Group A would then be compelled to attend that first summer. This first summer quarter would be relatively small since we would need to only offer a limited number of our second year courses: Likely 3 sections of ME211, 1 section of ME212, 1 section and three labs of ME251 and 3 sections of ME234 (for a total of 29 WTUs). After that first year, the students would then follow a predefined plan of attendance based on their group. Below are two possibilities: Plan I and Plan II (there are others to consider) which attempts to make M.E. enrollment the same each quarter including summer.

Plan I – Three groups attend three summers, one group attends zero summers.

		Year 2				Year 3				Year 4			
Group Letter	Su 22	Fall 22	Win 23	Spr 23	Su 23	Fall 23	Win 24	Spr 24	Su 24	Fall 24	Win 25	Spr 25	SU 25
A	x		x	x	x		x	x	x		x	x	
B		x		x	x	x		x	x	x		x	x
C		x	x		x	x	x		x	x	x		x
D		x	x	x		x	x	x		x	x	x	

Plan II – All Groups attend 2 summers.

Group Letter	Su 22	Fall 22	Win 23	Spr 23	Su 23	Fall 23	Win 24	Spr 24	Su 24	Fall 24	Win 25	Spr 25	SU 25
A	x		x	x		x	x	x	x		x	x	
B		x		x	x	x		x	x	x		x	x
C		x	x		x	x	x	x		x	x		x
D		x	x	x	x		x		x	x	x	x	

Admissions Fall 2022: For the second year, we would repeat the first year. For the second summer we would need to offer all our 2nd year courses and some early third year courses. This would likely be about 77 WTUs of classes. Also MATE210/215, CPE231, and CE204/207 would need to be offered.

Admissions Fall 2023: For the third year, we could then start mixing in more transfer students and put them in the same groupings. This is because we would then offer a full set of third year course in the summer of 2024 for those new transfers. That summer we would likely be offering

all our 2nd and 3rd year course plus a few 4th year courses. This would require approximately 240 WTUs of teaching.

Admissions Fall 2024: This would be our new steady state (maybe 250 FTFs and 50 Transfers). We will probably be adjusting the mix while we monitor demand and graduation rates. This would probably require about 330 WTUs of instruction each summer. Note that these estimates are for increasing the number of ME students only and would be higher if other department also increase enrollment for YRO. The table below shows an estimate of the extra teaching capacity needed if we were to move towards a full summer term.

Year	Increase in WTUs over 2019-2020
2021-2022	44
2022-2023	92
2023-2024	255
2024-2025	345
Steady State	345

We should anticipate that students will often need to change groups depending on their individual circumstance like internships, study abroad, falling behind and wishing to catch up or to accommodate our senior project class which requires attendance with the same team for three quarters. Given that it is unlikely that the group sizes will stay the same, we will need to increase SCUs in some quarters and summer enrollment will likely remain lower than the other quarters.

Instructional needs:
An additional 345 WTUs/ year (summer + additional freshmen) represents about eight additional full-time lecturers or twelve full-time tenure-track faculty. It is likely that summer teaching would be done with a mix of overload teaching for extra pay, for an alternative quarter off, and by new hires. Currently the department has the equivalent of 33 tenure and tenure track faculty (counting the chair, FERPS and PTRB), 10 full time lecturers and about 20 part time lecturers. To maintain our current tenure density of 58% of WTUs taught, we could likely cover the teaching load with this mix:

- 115 WTU: existing faculty (mix of tenure track and lecturers) taking overload for pay
- 140 WTU: five new tenure track hires
- 90 WTU: twos new full-time lecturers

Summary of Facility and Personnel Needs:

Personnel:

- 345 WTUs of ME teaching per year
- Xx WTUs of support courses each year for 250 more ME students (unknown count) e.g. Math, Physics, CE, EE, MATE, GE
- 5 New Tenure Track Hires
- 2 New full time lectures
- ½ position of office staff to deal with the higher number of students

- 1 full time technician to deal with year round laboratory support

Facilities:

- 7 new faculty offices.
- 1 new design lab to hold 24 students (30'x40') with tables and $20K for 12 computers
- 1 new computer lab to hold 32 students (30'x40') with tables and $60K for 32 computers
- 1 new Thermal Measurements lab (30'x40') with $100K for equipment and utilities as this lab will no longer be able to serve both ME236 and ME350.
- Higher Maintenance and consumable costs for labs ($40k per year?)
- Dedicated lab space to support research since existing labs will be in use for classes and no longer available in the summer for scholarship activities ($$$$)

Other Possible Enrollment plans:
Plan III – 3 Groups attend 2 summers, 1 group attends 1 summer – all finish in in Spring.

Group Letter	Su 22	Fall 22	Win 23	Spr 23	Su 23	Fall 23	Win 24	Spr 24	Su 24	Fall 24	Win 25	Spr 25
A	x		x	x		x	x	x	x		x	x
B		x		x	x	x		x	x	x	x	x
C		x	x		x	x	x	x		x	x	x
D		x	x	x	x		x		x	x	x	x

The plan above would have all groups finishing in spring quarter and have the added benefit that senior project courses run three consecutive quarters. Group B, however, would have to attend five quarters in a row which is not ideal. This plan would also require more classes to be taught in Winter and Spring than Fall and Summer which might be workable, but would problem require additional facilities.

END