

# Comprehensive Program Review

## A. Department Information

### Mission

Please enter your department's mission statement here.

De Anza College's Design and Manufacturing Technologies (DMT) program offers industry-driven, career education and training in the areas computer-numerical control (CNC) machining, computer-aided design (CAD), 3D printing/additive manufacturing (AM), and robotic automation. Faculty and staff are dedicated to preparing individuals for advanced manufacturing careers, promoting diversity, equity, inclusion and belonging among disproportionately-impacted and underrepresented populations, and addressing current and emerging workforce demand.

How does your program mission statement relate to the mission, vision and values of the college? (<https://www.deanza.edu/about-us/mission-and-values.html>)?

DMT is committed to continuous program improvement through curriculum innovation, technological advancements, responsive instructional design, and enhanced student equity in program enrollments and outcomes across all populations.

### Program Goals

Enter 1-3 goals for your department to be achieved by spring 2027. Each annual reflection will ask your department to report on progress in meeting your goals. Each goal should be aligned to your department's mission and the college mission. All resource requests and personnel requests should be aligned with your program's mission and goals.

Goal title	Goal description	Responsible parties	Collaboration with	Guided Pathways engagement	What evidence will be used to monitor progress?	How will you assess achievement of the goal?
Innovate DMT Curriculum	Enhance and expand DMT curriculum in the areas CAD, 3D printing/additive manufacturing (AM), multi-axis machining, and robotic automation.	DMT faculty	Business and Industry Leadership Team (BILT)	Yes	New and updated DMT course, certificate, and degree curricula.	Curriculum Committee and Bay Area Community College Consortium approval of industry-vetted DMT curricula.
Expand Industry Partnerships	Augment network of industry partners and co-sponsor three (3) distinct BILTs one for each DMT program: CNC Machining, CAD, and 3D Printing/AM.	DMT faculty and staff	Business and Industry Leadership Team (BILT)	No	Convene semi-annual BILT meetings for each DMT program.	Industry partners review and vet updated DMT curricula.
Promote DEI and Student Success	Promote diversity, equity and inclusion (DEI) and increase DMT program participation and course success rates for those who identify as female and other disproportionately-impacted populations.	DMT faculty and staff	Industry mentors	Yes	Program Review and Perkins Core Indicator data	Decrease gaps in successful Course completion rates

### Changes Imposed by Internal/External Regulations or Factors

Are there factors unique to your program that may affect your enrollment, success rates or staffing that RAPP should be aware of? (e.g., curriculum changes, program reorganization, noncredit curriculum, loss of personnel, legislative mandates, etc.)

To counter the negative affects of the COVID pandemic on DMT program's enrollment, program faculty and staff took the opportunity to evaluate curriculum offerings, industry trends, and strategies to promote DEI in program enrollment, retention, and completion. This work inspired the research and development of a successful National Science Foundation (NSF) Advanced Technological Education (ATE) grant: Manufacturing Automation and Additive Design Excellence (MAADE). The goals of the grant are to innovate and expand DMT course and program offerings, enhance industry partnerships, and promote DEI by increasing outreach and mentoring programs.

## B. Enrollment Trends

### Enrollment Variables and Trends

Enrollment Trends Applied Technologies - Design & Manufacturing Tech-DA						
	2018-19	2019-20	2020-21	2021-22	2022-23	5-yr %Inc
Unduplicated Headcount	570	525	414	346	397	-30.4%
Enrollment	1,530	1,255	875	870	982	-35.8%
Sections	117	108	88	109	111	-5.1%
WSCH	3,713	3,079	2,095	2,058	2,336	-37.1%
FTES (end of term)	247	205	140	137	156	-36.8%
FTEF (end of term)	6.5	5.9	4.3	5.4	5.3	-17.7%
Productivity (WSCH/FTEF)	573	524	491	382	438	-23.6%

In the data table above, what does the Enrollment trend indicate? For definitions of enrollment terms, please see the glossary (<https://www.deanza.edu/ir/documents/Glossary.pdf>).

- the data trend shows an increase in Enrollment
- the data trend shows a decrease in Enrollment
- the data trend shows no change and/or flat in Enrollment

### Reflect on Enrollment Trends

Discuss the factors that would help the college understand your programs' enrollment trends. How may these trends align with your program mission and goals?

The DMT program's enrollment was adversely affected by the COVID Pandemic. Starting in Spring 2020, course offerings were reduced as they could not be readily converted to 100% Online format. As the COVID-related restrictions to hybrid and on-campus course offerings eased, DMT faculty and staff were able to start revamping course offerings. Although enrollments for the 2020-21 and 2021-22 were down compared to 2018-19 at 875 and 870 respectively, DMT course offerings and enrollments started to rebound in Fall 2022. This positive trend is continuing, with combined Summer and Fall 2023 enrollments of 388, which puts the program on track to exceed annual enrollments of 1,000 for 2023-24.

### CTE Programs - Statewide and Regional Labor Market Trends

CTE Programs Only

1. Review and summarize the Lightcast Analyst Occupational Outlook data for your CTE program (<https://foothilldeanza.sharepoint.com/:f/s/dactedepartments/EiRTueQ8GrNLqtlQw2twpsBMFCs7X5djTVeo6Jss3W0Jg?e=1ybpMY>).

2. Cite current industry trends.

3. Provide an overview of your program advisory committee's recommendations relating to existing and new course and certificate/degree offerings. Cite additional data when applicable.

Based on California Employment Development Department labor market data for the period 2022-27, the seven (7) occupations associated with DMT program offerings are in high demand. Annual openings for each role are as follows:

- Machinists - 714
- CNC operators - 354
- Industrial engineering technicians - 113
- Mechanical drafters -110
- Mechanical engineering technicians - 89
- CNC programmers - 57
- Tool and Die makers - 32

There are a total of 1,471 annual openings for all associated occupations.

In Fall 2021, the DMT program conducted a survey of local manufacturing enterprises to determine current and projected labor market demand for 3D printing/additive manufacturing technicians, CAD designers, and CNC machinists. The results of this survey and subsequent discussions with industry partners informed the development of the NSF ATE MAADE grant. Since then, the DMT program has expanded its industry partnerships to adopt the Business and Industry Leadership Team (BILT) model as actively promoted by the NSF. During 2022-23, De Anza formed a BILT for 3D printing/additive manufacturing and conducted a comprehensive review of the required knowledge, skills, and abilities (KSAs) for additive manufacturing technicians. BILTs for CAD and CNC machining are under development and will be fully implemented later in 2023-24.

## D. Course Success

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### Course Success

Design & Manufacturing Tech-DA

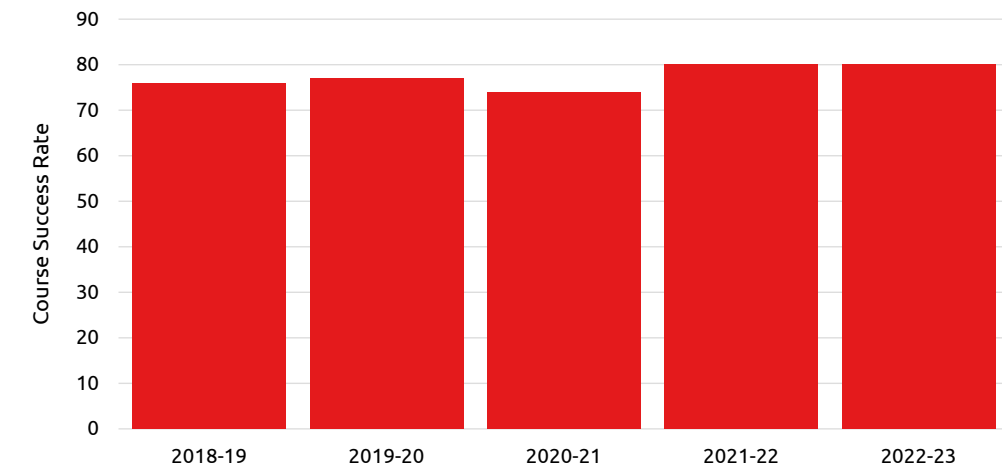
#### Who uses this report:

All users who want to further explore their enrollment or course success data.

#### What is this report:

This report is an extension of the Program Review Data Sheet. It has additional student characteristics and users can compare two groups of students at the same time.

#### Limits:



#### Limits:

Measures: Enrollments and Course Success Rate and Success Count

	2018-19			2019-20			2020-21			2021-22			2022-23		
	Enrollments	Course Success Rate	Success Count	Enrollments	Course Success Rate	Success Count	Enrollments	Course Success Rate	Success Count	Enrollments	Course Success Rate	Success Count	Enrollments	Course Success Rate	Success Count
<b>Measures</b>	1,530	76%	1,162	1,255	77%	961	875	74%	649	870	80%	696	982	80%	787

Data loaded 17-Aug-2023

In the data table above, what overall trends are you seeing in Course Success?

- the data trend shows an increase in Course Success
- the data trend shows a decrease in Course Success
- the data trend shows no change in Course Success

### Exploring Course Success Rate Trends

1. What could be factors that influence success rates in your department?
2. What strategies does your department have in place to increase or maintain current success rates?
3. Are there other trends that you see when exploring different courses in the same department (How to access success rates by course: [https://www.deanza.edu/ir/documents/How\\_to\\_Access\\_Your\\_Program\\_Review\\_Data.pdf](https://www.deanza.edu/ir/documents/How_to_Access_Your_Program_Review_Data.pdf))
4. How do course success rate trends align with your program goals?

After a drop to a 74% Course Success Rate during the COVID pandemic years 2020-21, the rates are trending back to 80% for both 2021-22 and 2022-23. In order to build upon the improvement trends, DMT faculty have implemented a number of strategies to continue to enhance student outcomes. These are summarized below.

- Expanded DMT lab access for students to complete assigned projects.
- Realigned class projects and assessments to better reflect course topics.
- Support provided by DMT Lab Coordinator and Technician has been instrumental to ensure the smooth operation of labs and equipment.
- Provide supplemental 1:1 bilingual (English/Spanish) instructional assistance to enhance student understanding and outcomes.
- Promote greater DMT program access, retention, and success by individuals from disproportionately impacted and underrepresented populations, including those who identify as female, Black, and Latinx.

# Course Success with Disproportionate Impact (credit and non-credit)

Limits: 2022-23

**Who uses this report:**

All users who want to explore student equity and disproportionate impact in course success.

**What is this report:**

This report highlights student groups with a negative percentage point gap and student groups experiencing disproportionate impact. Data reflects credit sections. Student groups with "N/A" enrollment denotes suppressed data.

**How to interpret the data:**

A negative percentage point gap means a student group has a lower success rate than the comparison group consisting of all students not in the student group being examined. When a student group is experiencing disproportionate impact, this means that (1) there is a negative percentage point gap and (2) this gap is unlikely to be due to chance. Programs are encouraged to prioritize discussions and address the student groups experiencing disproportionate impact.

**New features:**

To display only student groups with disproportionate impact, click on the link "Click here to show only groups with disproportionate impact." To add a comparison unit that is one level higher (e.g., course level compared to department level), **be sure to select a college, division, department or course**, then click on the link "Click here to show and compare disproportionate impact with [X]".

**Success rate**

The number of students receiving an A, B, C or P grade divided by the total number of students receiving a grade. Rate is rounded.

**Comparison success rate**

The success of all students except for the group being examined (e.g., the comparison success rate for Latinx students is the success rate of all students who are not Latinx). Rate is rounded.

**Additional successes needed to erase percentage point**

This value provides a way for practitioners to think of gaps in terms of student successes, and illustrates the number of additional successes needed to avoid a percentage point gap.

**Legend:**

**Yellow:** Student groups experiencing a negative percentage point gap that is not statistically significant

**Orange:** Student groups experiencing disproportionate impact according to the Percentage Point Gap Minus One (PPG-1) method<sup>1</sup>

Currently showing all groups. [Click here to show only groups with disproportionate impact.](#)

[Click here to show and compare disproportionate impact with .](#)

Hide cells with fewer than  students

Applied Technologies - Design & Manufacturing Tech-DA						2022 Summer to 2023 Spring	
Number of sections: 111							
Student group	Enrollment at census	Student group success rate	Comparison success rate	Percentage point gap	Chart	Additional successes needed to erase percentage point gap	
All Students (Design & Manufacturing Tech-DA, 111 sections)	982	80%	80%	0			
Asian	379	78%	81%	-3		11	
Black	12	50%	81%	-31		4	
Filipinx	65	85%	80%	+5			
Latinx	209	76%	81%	-5		11	
Native American	13	85%	80%	+5			
Pacific Islander	20	90%	80%	+10			
Unknown ethnicity	N/A						
White	279	85%	78%	+7			
Female	87	78%	80%	-2		2	
Male	869	80%	81%	-1		13	
Non-Binary	0						
Unknown gender	26	92%	80%	+12			
Foster youth	N/A						
Individuals with disabilities	26	81%	80%	+1			
Low Income	451	76%	84%	-8		38	
Not Low Income	531	84%	76%	+8			
Veterans	13	85%	80%	+5			

<sup>1</sup>The PPG-1 method follows the CCCC method for calculating disproportionate impact. Disproportionate impact is when (1) a student group's PPG value is less than -2 (e.g., -3, -4, -5, etc.) and (2) the absolute PPG value is greater than the calculated margin of error. PPG is calculated by comparing a student group's success rate against the success rates of all students except for the group being examined (e.g., Latinx PPG is Latinx success minus the success of all students except for Latinx students).

In the data table above, what does the data indicate about the Success rate of various ethnic groups within your department compared to the comparison group for the most recent academic year? (i.e., as displayed in the Percentage point gap column)

The Percentage point gap between Asian students and all other students shows:

- there is no gap (e.g., 0)
- there is a negative gap of 5-percentage points or less (e.g., -5)

there is a negative gap greater than 6 percentage points (e.g., -6)

there is a positive percentage point gap (e.g., +2)

The Percentage point gap between Black students and all other students is:

there is no gap

there is a negative gap of 5-percentage points or less

there is a negative gap greater than 6 percentage points

there is a positive percentage point gap

The Percentage point gap between Filipinx students and all other students is:

there is no gap

there is a negative gap of 5-percentage points or less

there is a negative gap greater than 6 percentage points

there is a positive percentage point gap

The Percentage point gap between Latinx students and all other students is:

there is no gap

there is a negative gap of 5-percentage points or less

there is a negative gap greater than 6 percentage points

there is a positive percentage point gap

The Percentage point gap between White students and all other students is:

there is no gap

there is a negative gap of 5-percentage points or less

there is a negative gap greater than 6 percentage points

there is a positive percentage point gap

The Percentage point gap of one additional group of your choice:

there is no gap

there is a negative gap of 5-percentage points or less

there is a negative gap greater than 6 percentage points

there is a positive percentage point gap

not applicable

## Exploring Gaps in Successful Course Completion by Ethnicity

1. What differences do you see in successful course completion rates by ethnicity?

2. What are your thoughts on these differences?

3. Are there other trends that you see when drilling into the data that may be important for your department to explore (e.g., foster youth, individuals with disabilities, low income, veterans)?

4. Which additional student group did you choose to explore and why?

5. How do these trends align with your program's mission and goals?

Promoting DEI in program participation and reducing course completion gaps for disproportionately impacted groups is clearly stated in the DMT program mission. Specifically, one of the primary goals of the NSF ATE MAADE grant is to increase course enrollments and program completion rates for individuals who identify as female, Black and Latinx. In addition, DMT faculty and staff are committed to supporting the success of students from other disproportionately impacted groups including individuals with disabilities, Pilipinx, Veterans, and low-income students. To realize the goals, the DMT program has adopted the following strategies.

- Recruited new adjunct faculty who reflect the diversity of DMT students, including individuals who identify as female. Spanish and Vietnamese-speaking staff and faculty offer culturally and linguistically responsive instruction.
- Increased outreach to both industry and secondary partners, including hosting guest speakers from Women in 3D Printing and facilitating numerous program and facilities tours for high schools, industry groups, and community-based organizations.
- Offered two Dual Enrollment classes in partnership Fremont Union HSD: Survey of Design and Manufacturing Processes (DMT 55) and 3D Printing and Rapid Prototyping (DMT 53).

Based on the success of the previously mentioned initiatives during 2022-23, these outreach efforts and Dual Enrollment offerings are being continued during 2023-24.

## Teaching and Learning Strategies

1. What teaching and learning strategies might be helpful in narrowing any gaps in successful course completion?

2. How do the listed teaching and learning strategies align with your program's mission and goals?

The DMT program has adopted a number of teaching and learning strategies to address gaps in successful course completions for disproportionately impacted populations. These are consistent with current best practices and innovation to better address course success gaps and enhance outcomes for all students, with a focus on disproportionately impacted groups. The goals and objectives of the NSF ATE MAADE grant are also focused on identifying and implementing innovative teaching and learning strategies to enhance DEI and improve program outcomes.

- Peer tutoring and professional mentors offer 1:1 support to students.
- New adjunct faculty and staff to provide in-language, in-culture individualized instructional assistance.
- Internship and work-based learning opportunities connect education to careers, including the NASA HUNCH partnership.

## Trends in Awards

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## Degrees and Certificates by Ethnicity

Design & Manufacturing Tech-DA

**Who uses this report:**

All users who need degree and certificate data.

**What is this report:**

Measures: Awards

Award Group	Ethnicity	2018-19	2019-20	2020-21	2021-22	2022-23
Associate in Science	Asian	4	8	4	7	4
	Filipinx	1			1	4
	Latinx	5	3	2	3	3
	White	8	6	4	9	4
	<b>Total</b>	<b>18</b>	<b>17</b>	<b>10</b>	<b>20</b>	<b>15</b>
Credit Certificate-Transcriptable	Asian	13	20	14	25	20
	Black			1		
	Filipinx		1	1	3	2
	Latinx	11	11	8	11	9
	Native American					1
	Pacific Islander					1
	White	19	15	23	24	11
	<b>Total</b>	<b>43</b>	<b>47</b>	<b>47</b>	<b>63</b>	<b>44</b>
	<b>Total</b>	<b>61</b>	<b>64</b>	<b>57</b>	<b>83</b>	<b>59</b>

Data loaded 24-Oct-2023

In the data table above, what are the trends in regard to the number of awards within your program?

Trends in Associate Degrees awarded show:

- an increase in the number of Associate Degrees awarded
- a decrease in the number of Associate Degrees awarded
- no change in the number of Associate Degrees awarded
- Not applicable

Trends in Associate Degrees for Transfer awarded show:

- an increase in the number of Associate Degrees for Transfer awarded
- a decrease in the number of Associate Degrees for Transfer awarded
- no change in the number of Associate Degrees for Transfer awarded
- Not applicable

Trends in Credit Certificates awarded show:

- an increase in the number of Credit Certificates awarded
- a decrease in the number of Credit Certificates awarded
- no change in the number of Credit Certificates awarded
- Not applicable

Trends in Non Credit Certificates awarded show:

- an increase in the number of Noncredit Certificates awarded
- a decrease in the number of Noncredit Certificates awarded
- no change in the number of Noncredit Certificates awarded
- Not applicable

## Reflecting on Trends in Awards

1. What trends do you see across awards in your department?
2. How do the trends in awards align with your program's mission and goals?

. Overall, the total number of certificates and degrees that the DMT program has awarded over the past five (5) years has remained steady. It should be noted that these are an uptick in the 2021-22 program year. The biggest increase in the number of awards has been for Certificates of Achievement, with a total of 41 for 2020-21, 52 for 2021-22, and 42 for 2022-23. Programs of note include the Quality Control Technician and CNC Machinist certificates.

## Reflecting on Award Offerings

1. For each program leading to an award, identify any courses that have not been offered in the last two years. Briefly explain why the courses have not been offered. For courses that will not be offered, how does your program plan to update the program so that students can complete the requirements?
2. Based on a review of course offerings and the number of awards offered and conferred, is your department planning on removing any degrees or certificates from the college catalog? If so, please list those being removed and a short explanation as to why.
3. Does your department have any plans to offer new degrees or certificates? If so, please list and provide a short explanation as to why.

To build upon current success in awards, DMT faculty will update existing certificate and degree program to keep them responsive to industry trends and ensure that they prepare students for the full range of current and emerging advanced manufacturing career opportunities. Below are specific objectives completed during 2022-23 and planned for 2023-24 and 2024-25.

- Launched new COA in Additive Manufacturing: 3D Production and Production.
- Update Product Modeling Making AS and COA-A to incorporate input from Business and Industry Leadership Teams (BILT).
- Incorporate new courses in Multi-Axis CNC Machine Simulation/Robotic Automation and Advanced Live-Tooling CNC Lathes (currently under development) into CNC Machinist COA-A and AS degree.

- Partner with CTE Counselors to offer presentations and workshops on how to apply for certificate and degree awards and prepare for transfer.

## Staffing Trends

### Faculty Workload

Faculty Workload Applied Technologies - Design & Manufacturing Tech-DA						
	2018-19	2019-20	2020-21	2021-22	2022-23	5-yr %Inc
Full Time Load	2.7	2.7	2.3	2.7	2.3	-17%
Full Time %	42.3%	46.8%	54.1%	50.5%	42.8%	1%
Overload	1.5	1.3	0.6	1.1	0.9	-38%
Overload %	22.6%	22.3%	13.1%	20.4%	17.0%	-25%
Part Time Load	2.3	1.8	1.4	1.6	2.1	-6%
Part Time %	35.1%	30.9%	33.0%	29.1%	40.2%	15%
Total FTEF	6.5	5.9	4.3	5.4	5.3	-18%

What trends do you see in the last five years in regard to the Full Time %? (i.e., percentage of classes being taught by full time faculty, not including overload or summer)

- the data trend shows an increase in Full Time %
- the data trend shows a decrease in Full Time %
- the data trend shows no change in Full Time %

### Staffing Needs

Provide a brief overview of your department's staffing needs. Personnel requests are to be submitted on a separate form.

1. What are full time faculty needs to ensure the program's health, growth or vitality?
2. What are classified staffing needs to ensure the program's health, growth or vitality?
3. What strategies does your program have in place to ensure students are being successful when faced with the current staffing ratios?
4. What strategies does your program have in place to retain new faculty, if applicable?

Based on industry input and regional labor market demand, the DMT Department will be expanding its course and program offerings in the area of 3D printing/additive manufacturing (AM). In order to implement a fully-fledged 3D printing/AM program, the DMT Department is requesting one (1) new FTE faculty member (1.00). Having a full-time faculty member dedicated exclusively to 3D printing/AM is crucial to ensure that existing curricula are updated and new course content is developed in response to industry trends in this rapidly evolving sector. Likewise, a full-time faculty member will have the bandwidth to engage in frequent and high-impact networking with industry partners, keep the program relevant, develop internship and mentoring programs for students, and connect program completers with employment opportunities.

In addition to the importance of a growth FTE faculty position, maintaining the existing staffing levels for faculty and Classified Professionals (Computer Lab Instructional Coordinator and Technician) is essential to ensure smooth instructional programming and lab operation, reduce course success outcomes gaps and attain program improvement goals.

## Assessment Cycle

### Student Learning Outcomes Assessment Cycle

Navigate to <https://www.deanza.edu/slo/#post> which will take you to an accordion listing of SLO assessments under "Student Learning Outcomes and Assessments Summaries by Division"

1. Summarize the dialogue that has resulted from SLO and/ or PLO assessments.
2. What specific strategies has your department implemented, or plan to implement, based on the results of the SLO/PLO assessments conducted?
3. How do these strategies align with the program's mission and goals.

The same methods that we have been used to improve student success rates in the courses have improved success rates on the SLOs. The DMT department is consistently creating defined rubrics for grading, multimedia online materials, extended lab times, and experienced student and industry peer mentors.

In addition, the department will continue to make adjustments to course outlines, create new courses and new lab assignments to keep skills relevant to the fast-paced advanced manufacturing environment. These constant enhancements result in more career opportunities for design and manufacturing students.

### Dean/Manager Comments

I am fully aligned with the vision, goals, and the narrative outlined above by the DMT department. The enrollments have improved since the pandemic, as students are now able to attend the in-person labs. The department has also taken proactive steps to improve gaps and support underrepresented students. After discussing, staffing needs with the department chair, I fully endorse their request to hire a full-time faculty in the near future. This instructor would be dedicated to teaching 3D printing/AM while also contributing actively to ongoing curriculum development by staying up-to-date with industry trends. Through these efforts, the department can collectively ensure that students are prepared for their future careers.

**STOP. Do not submit form. Please inform your dean/manager when the form is complete. They will submit the form when they have added their comments above.**

This form is completed and ready for acceptance.