De Anza College
Program Review – Annual Update Form

1. Briefly describe how your area has used the feedback from the Comprehensive Program Review provided by RAPP members (if unsure, request the feedback form from your dean/manager).

   During 2024-25, **Design and Manufacturing Technologies (DMT)** entered into the final year of its three-year **National Science Foundation (NSF)** funded Advanced Technological Education project: **Manufacturing Automation and Additive Design Excellence (MAADE)**. In conjunction with MAADE, the DMT Department is fully engaged in a range of program improvement and curriculum enhancement activities. These initiatives have had a positive impact on the department's student outcomes and curricular offerings. However, in order to **fully implement** these changes and maintain these levels of student services and support on an ongoing basis, **additional faculty** staffing is imperative.

   DMT Department faculty and Classified Professionals considered the RAPP committee's **Comprehensive Program Review feedback**. Responses to the clarifying questions and recommendations put forth by the membership, including specific outcomes **achieved during 2024**, are highlighted below.

   - Calibrated the DMT program's Mission and Vision Statement to more closely align with De Anza's college-wide Vision and Values.
   - Reassessed the program's existing **course** and **award offerings**.
   - Utilize multiple data sources to **analyze** student and program-level **outcomes**, including Program Review Data, Perkins Core Indicator data, SWP Metrics, and NSF Student and Key Partner surveys.
   - Implemented **outreach** and **retention** activities to **increase** program **enrollments** and improve **student success**.
   - Strengthened connections with **key industry partners** and expanded internship and employment opportunities for DMT students.

2. Describe any changes or updates that have occurred since you last submitted program review (comprehensive program review submissions)

   During 2024, the **DMT Department** had a number of noteworthy accomplishments in the areas of **curriculum development**, **industry partnership strengthening**, and **promoting accessibility, equity**, and **inclusion** for students from disproportionately impacted populations. These included the following.

   DMT Curriculum Innovation *(as listed under CPR Goal 1)*

   - Updated curricula of two foundational courses in the DMT 3D Printing/AM Technology sequence: **Introduction to 3D Printing/Additive Manufacturing** (DMT 53) and **3D Printing/Additive Manufacturing: Applications and Practice** (DMT 57).
   - Created new instructional content for inaugural **Design for Additive Manufacturing** (DfAM/DMT 57) class offered in Spring 2024.

- Reconfigured existing Product Model Maker Certificate and A.S. curriculum to incorporate industry feedback and recommendations.
- Received California Community Colleges Chancellor's Office approval of **Advanced Manufacturing and Prototyping Technician Certificate** and **A.S. degree** curricula, both of which were launched in Fall 2024.

DMT Industry Partnership Enhancement *(as listed under CPR Goal 2)*

- Convened Product Prototype and Model Maker **Business and Industry Leadership Team** (BILT) to review KSAs and determine configuration of updated Certificate of Achievement-Advanced and A.S. degree curriculum.
- Formed new partnership with **Festo**, a global leader in automation technology and technician training, to expand DMT offerings and in the areas of **industrial automation** and **robotics**.
- Discussed the creation of **new internship opportunities** for DMT students at Standard Linear Accelerator (SLAC) and NASA/Ames Research Center.

Increased Participation of Women and Promoted DEI in the DMT Program

- Expanded DMT program **outreach activities**, including hosting numerous tours for secondary, adult school, community organizations, and industry partners.
- Promoted adjunct faculty and **professional mentors** whose backgrounds and lived experiences mirror the diversity of DMT student populations.
- Offered two **Dual Enrollment** classes in partnership with Fremont Union High School District.
- Hosted **industry guest speakers** from Maxar – Spacecraft Development, Women in 3D Printing, and Stratasys.
- Sponsored De Anza student-led, **3D Printing Club** that offered DMT and Engineering students a place to network, showcase their projects, share technology tips, and participate in demonstrations and discussions.

3. Provide a summary of the progress you have made on the goals identified in your last program review (as included in the comprehensive program review).

   The following is an overview of the DMT Department's progress towards addressing its identified goals in the last Comprehensive Program Review and continuing throughout the remainder for the 2024-25 academic year.

DMT Curriculum Innovation

- Currently incorporating **robotic automation processes** and technology into DMT multi-axis CNC courses.
- Initiated the development of a **new industrial automation** pathway that aligns with the NC3 Robotics and Industrial Automation certifications.

DMT Industry Partnership Enhancement

- Expanding partnerships with **Northrup Grumman**, which is projecting to hire 90 CNC machinists and QC inspectors over the next three years.

- Collaborating with **FM Industries** to establish an apprenticeship program to train CNC machinists.

Increased Participation of Women and Promoted DEI in the DMT Program
(as listed under CPR Goal 3)

- Strengthened DMT **peer** and **professional mentoring program** to enhance success of all students, with an emphasis on supporting the success of those from disproportionately impacted groups. The number of mentors increased from one (1) to three (3) during 2024-25.
- **Increased** the **enrollment** of students who identify as female from 87 in 2022-23 to **123** in 2023-24.
- Likewise, **enrollment** of students who identify as Black **increased** from 12 in 2022-23 to 21 in 2023-24. The **success rate** for these students in DMT classes was **81%**, higher than the aggregate success rate for the department.

4. If your goals are changing, use this space to provide rational or background information, for any new goals and resource requests that you'll be submitting that were not included in your last program review.

Building upon the success of the NSF MAADE project initiatives, the DMT Department is planning to **expand** its curriculum in the area of **industrial automation** by incorporating aspects into **advanced CNC machining** classes, as well as creating a **new entry-level technician** training program aligned with Festo's **Fundamentals of Robotics** certification. Likewise, based on industry guidance, DMT faculty are **reconfiguring** the existing **Quality Control Technician** certificate program to incorporate updates in technology.

To properly achieve these objectives, the DMT Department needs resources to complete the following.

- Acquire a **Festo industrial automation lab system**, accompanying robotic tending stations, and accessories.
- Update its **metrology** and **inspection equipment** and software resources.

Specific details about the items requested and their proposed utilization are listed below and on the Resource Request Sheet.

Request	Goal
AC/DC Training System	Fundamental Industrial Automation trainers for student use (Goal 1,3)
Mec Lab System	
PLC Training System / Sensors / Fluid Power Workstation	Intermediate Industrial Automation trainers for student use / Increase employment opportunities (Goal 1,3)
Cp Lab System	Advanced Industrial Automation System for demonstration and student training. Increase employment opportunities (Goal 1, 2, 3)

Calypso Software update / Tesa CMM	Software update for demonstrations and student use (Goal 1,3)
CMM Manger advanced inspection / CMM Software - 3D Application	Advanced software for demonstrations and student use (Goal 1,2,3)

5. Describe the impact to date of previously requested resources (personnel and instructional equipment) including both requests that were approved and were not approved. What impact have these resources had on your program/department/office and measures of student success or client satisfaction? What have you been able to and unable to accomplish due to resource requests that were approved or not approved?

   Thanks to the allocation of resources and support provided through Strong Workforce and Perkins funding, the DMT Department has been able to update its equipment in the areas of CNC machining and 3D printing/additive manufacturing. Acquisitions made during 2024 included **Universal Robotics** and **FANUC robotic arms** and a **UMC 500 SS 5-axis machining center**. The 3D printing/additive manufacturing area purchased **Fuse-1 SLS**, **Form 3 SLA**, and **Bambu Lab FDM** printers. This state-of-the-art equipment ties directly to Goals 1 and 3 as outlined in DMT's most recent Comprehensive Program Review.

   However, the acquisition of **instructional equipment** and software, itemized above under Question 4, is critical to move forward with the next phase of the **new industrial automation** program and implement curricular and program updates in the **CNC machining**, **3D printing/additive manufacturing**, and **quality control/metrology** areas. The expanded curricular offerings will increase access points, industry-vetted training, and future employment opportunities to current and future cohorts of DMT students. Without this technology, these innovations would not be able to be realized.

   Adequate faculty staffing is essential to implement these program advancement initiatives and keep the DMT Department current with technology and trends in the Bay Area advanced manufacturing sector. For over a decade, the DMT Department has been **understaffed** by one full-time faculty (FTE) member, following a retirement in 2013. In addition, the growth of DMT offerings in 3D printing/additive manufacturing has increased substantially since that time.

   Furthermore, the DMT Department's work on the development of the **new industrial automation** pathway is at the request of the FHDA Chancellor and the Dean of CTE, with the support of industry sponsors Festo and NC3 Certification. Notwithstanding, the development of the **new program**, coupled with the on-going department understaffing, is putting a strain on DMT's current faculty and staff. To fully develop, launch, and maintain the industrial automation program a **second full-time faculty** position is crucial.

6. How have these resources (or lack of resources) specifically affected disproportionately impacted students/clients?

   The DMT Department is grateful for the resources that were allocated by the RAPP during 2024. They were utilized to acquire new, state-of-the-art instructional equipment. Not only has this equipment increased students' access to current industry technology, but it also helps them prepare for careers in roles where these knowledge and skill sets are essential to attain and retain employment in the regional advanced manufacturing sector.

Since opening the newly renovated 3D printing/additive manufacturing and CAD classroom and lab facilities in Winter 2024, DMT has been able to increase course offerings and capacity, by scheduling multiple courses concurrently in different sections of the building. In addition to more CAD/CAM workstations available for DMT students, there is also a larger 3D printing/additive manufacturing lab, where students work collaboratively to complete class projects.
With the use of SWP funding approved by RAPP during 2024, the CNC machining area acquired a new multi-axis machining center and high-speed Haas CNC mills. This updated equipment provided additional workstations for students to complete class labs and projects, while offering access to the same technology and software used by advanced manufacturing enterprises throughout the Bay Area. As a result of increased access to equipment, DMT students are better situated to secure employment in the sector. The improved employment outcomes, in combination with course and program-level success, equates to greater overall impact on students' economic mobility.

7. Refer to your Comprehensive Program Review under the section titled Assessment Cycle as well as the SLO website (https://www.deanza.edu/slo/) for instructional programs. In the table below provide a brief summary of one learning outcome, the method of assessment used to assess the outcome, a summary of the assessment results, a reflection on the assessment results, and strategies your area has or plans to implement to improve student success and equity. If your area has not undergone an assessment cycle, please do so before completing the table below.

Example below is from DMT 80, Mike Appio

Table 1. Reflection on Learning Outcomes (SLO, AUO, SSLO)

Learning Outcome (SLO, AUO, SSLO)	Analyze, construct, and inspect assigned machined projects using introductory principles of machining.
Method of Assessment of Learning Outcome (please elaborate)	Students are accessed upon completion of two major projects (tap handle and tape dispenser). The students receive two inspection sheets (rubric) with defined scores for each dimension on the drawing, which are used to inspect the part using micrometers and calipers. Upon completion, the projects and inspection sheets are turned into the instructor. The instructor will repeat the inspection process and check for accuracy and completion.
Summary of Assessment Results	A total of twenty-four students completed the course. Twelve exceeded expectations, ten met expectations and two did not meet the student learning outcome. The course requires mandatory in person attendance.
Reflection on Results	Upon examining the results, the students who utilized all required lab times to complete the projects exceeded or met expectations. Students who were consistently late or absent did not meet expectations
Strategies Implemented or Plan to be Implemented (aka: enhancements)	Students are reminded that starting on time and full participation of lab is essential to course success. The DMT department has already implemented additional lab courses for students who need extra time to complete lab projects and make up time due to excused absences.

Done? Please email this form to your dean/manager.

8. Dean Manager Comments:

The Design and Manufacturing Technologies Department has excelled in updating its curriculum, building industry partnerships, and promoting diversity and inclusion. The department's strong commitment to preparing students for emerging industry demands is evident in its focus on industrial automation, robotics, and additive manufacturing.

Outreach initiatives have boosted Black student enrollment from 12 in 2022-23 to 21 in 2023-24, achieving a success rate of 81%, which is higher than the department average. Additionally, the number of female students increased from 87 in 2022-23 to 123 in 2023-24, reflecting the department's effective outreach strategies. The expansion of peer and professional mentoring has further supported student success, but sustaining and scaling these efforts will require additional faculty and outreach resources.

I fully support the department's goals of:
• innovating the curriculum, including integrating robotics into CNC courses and establishing a new industrial automation pathway.
• expanding industry partnerships, particularly with Northrop Grumman and FM Industries, to create more job and apprenticeship opportunities.
• growing outreach to enroll underrepresented students and mentoring programs to ensure their success.
• expanding programs like dual enrollment and developing a partnership with Uniquely Abled Academy to support high-functioning young adults with autism in becoming CNC machine operators and securing employment.

The department urgently needs more faculty positions to maintain momentum, alleviate the strain on current faculty and staff, and ensure that program advancements are fully developed and implemented. Faculty shortages have persisted since retirements in 2013, and the current growth, including the development of the industrial automation pathway, necessitates at least two additional full-time faculty members. I thank the faculty and staff for all their hard work and dedication to the department's commitment to student success.