2021-2022 Comprehensive Instructional Program Review - MTT Latest Version

2021-2022 Comprehensive Instructional Program Review

Program Overview and Goals

Mission and Alignment : Version by **Vo, Chuong** on **02/09/2022 02:29**

The Machine Tool Technology program provides the diverse student body in the surrounding regional community with advanced education in machine tool technologies and serves students who seek job skills, industry certifications or an Associate Degree for employment or university transfer. The Department aims to provide basic to advanced training in manual or conventional machining, computer numerical programming and operation, advanced multi-axis programming and operation. These form the fundamental skills necessary for the average and expected workload in the machining industry. Enrolled students are strongly positioned for employment in the machining industry throughout the course of the Program.

Explain how your program supports the College's Mission.
The Machine Tool Technology program embraces the college's philosophy that education is a lifelong learning process of cultivating diversity, equitable mindsets, and critical thinking skills that also enhances quality of life by developing our students' technical skills and nurturing their opportunities with related business and industrial communities.
The Machine Tool Technology program supports the technical education side of the college's mission by providing basic and advanced training in conventional machining, computer numerical programming and operation, advanced multi-axis programming and operation, inspection, and industrial maintenance. These form the fundamental skills necessary for the average and expected workload in the machining industry, and strongly positions students for employment in the machining industry and for becoming productive members of their communities.

Degrees and Certificates : Version by **Vo, Chuong** on **11/17/2021 08:01**

List the degrees and certificates the program offers as well as the number of units or courses required to complete the program.
Certificates of Achievement:

- Coordinate Metrology – Certificate, 12 units
- Industrial Technology Automated Manufacturing – Certificate, 19.5 units
- Machinist – Certificate, 22 units
- Numerical Control Machine Operator – Certificate, 20.5 units
- Numerical Control Tool Programmer – Certificate, 29.5 units
- Tool and Die Maker – Certificate, 20.5 units

Degrees:

Machinist - A.A., 22 units + GE units
Numerical Control Machine Operator - A.A, 20 units + GE units
Tool and Die Maker - A.A., 24 units + GE units
Numerical Control Tool Programmer - A.A., 31.5-33.5 units + GE units

Six-Year Program Goals : Version by **Vo, Chuong** on **02/09/2022 02:29**

The Program has five new goals to work on in the next six years:

- Goal 1 (A) will be focusing on increasing enrollment, retention, and completion. The immediate and realistic goal is working on returning enrollment to pre-pandemic levels, re-assessing, then continuing. The department will continue its outreach effort to high schools, the public, industrial businesses, and organizations. The department will also promote career awareness especially to women, explain educational opportunities, pathways to completion through frequent high school presentations, participation in career and education fairs, business networking, and social media. This goal is supported by goals 2, 3, 4 and 5 below.

- Goal 2 (E) will be to revise and update the Metrology Certificate and related courses to focus on Inspection Methods, Techniques, and Reporting Standards while maintaining the existing total 12 units requirement. The department will provide students and the workforce a well-rounded training and the ability to adapt to evolving technology and metrology methods used in industry. This revision will attract engineering students, female students, and others who are interested in a well-paid manufacturing career but not necessarily a machining focus.

- Goal 3 (A) will be to revise current course numbers and apply for transferable and distance learning status. These changes are meant to provide the department the flexibility to offer transferable hybrid courses to attract more high school students who may not be considering attending university immediately after graduation, as well as creating a transferable path for older adults and reverse transfer from current university students who want to take advantage of attending classes and having access to the department extensive modern lab equipment.

- Goal 4 (B) involves a plan to collaborate with the Engineering Design and Plastics Manufacturing departments to develop mold-making classes. Through this collaboration, the department will provide students a broadened perspective and well-rounded training into the entire mold-making processes including mold fabrication, assembly, maintenance, and repair.

- Goal 5 (C) will be to hire a part-time laboratory assistant and another full-time faculty member to improve program flexibility and stability.

The old and new program goals are meant to constantly improve the program to address student and industry needs. However, it is an ongoing process, and as we achieve our goals, we will be one step closer to reaching our vision of ceaseless pursuit of making improvement in students' education, completion, and professional career attainments.

Program Goal	College's Goals Supported (Goal A - Goal F)	Status (not started; in progress; on hold; cancelled; completed; continued)	Action Plans/Timelines/Resource Needs
Improve Program Enrollment and Success Rates	A	Continued, Roll into New Goal	Continue with High School and Public Outreach
Develop a pool of qualified candidates for part-time instructor positions	C	Continued	Continue to inquire for candidates through Advisory Committees and Industry Networks and Contacts
Revise and Update Multi-Axis Curriculum	E	Continued	Combine and Replace MTT 71 and 72 into MTT 279, a new course for MasterCam Multi-Axis Programming, including Four and Five Axis, and Mill-Turn Programming. Combine and Replace MTT 96L and 97L with the addition of lecture into MTT 280, a new course for Multi-Axis CNC Machining Center Setup and Operation.
Improve Robotics Instruction availability	C	Continued	Will offer MTT120 after Covid restrictions are lifted, equipment is installed, and instructors complete training.
Expand Student Body Diversity	D	Continued	Continue with High School and Public Outreach
Develop and Implement an Alumni Employment Tracking Database	D	Continued	Continue encouraging students to report and update their employment status during enrollment and post graduation.
Seek additional funding for high tech equipment: Shrink Fit Tooling and Laser Machine	E	Continued	Laser Machine needs upgrading, the MTT program currently shares an older machine with Engineering Design.
Revise and update the Metrology Program to focus on Inspection Methods, Techniques, and Reporting Standards.	E	New - Started	Revise Coordinate Metrology Certificate of Achievement requirements (12 units) to include (four new courses) MTT 130, 131, 132, 133, (two existing courses) MTT 111, and MTT 180. MTT 130 - Shop inspection systems and practice, 2 units. MTT 131 - Geometric Tolerancing using Verisurf, 2 units. MTT 132 - Fixture and Tool Building using Verisurf, 2 units. MTT 133 - Applications of Metrology using Verisurf, 1 unit. MTT 111 - PLC in automated manufacturing, 2 units. MTT 180 - Robotics for CNC Machines, 3 units.
Revise Course Numbers and Apply for Transferable and Distance Education Status	A	New - Start in Spring 22	Apply for transferable status with new course numbers and DE approval during 2021-2022.
Collaborate with Engineering Design and Plastics Manufacturing Departments to develop mold making classes	B	New - In Progress	Revise MTT Lab Projects to be Mold Making oriented.
Hire a part-time Laboratory Assistant and Full-Time Faculty Member	C	New - In Progress	Acquire additional personnel to ease workload of current lone Full-Time Faculty

Assessment Report and Data Analysis

Assessment Report (Part 1: Assessment Table) : Version by **Vo, Chuong** on **11/17/2021 08:01**

Course by SLO	Expected Performance	Performance
MTT59 - MasterCAM Turning		
Students machine the lathe part on the blueprint virtually with the appropriate cutting tools and processes. (Active from 2017 SP)	100.00%	79.55%
Students can modify their turning machining process if the result produced is not accurate. (Active from 2017 SP)	100.00%	68.18%
Students can setup their stock and geometry accurately in preparation for milling processes. (Active from 2017 SP)	100.00%	81.82%

Course by SLO	Expected Performance	Performance
MTT59 - MasterCAM Turning		
Students can create basic geometry needed for machining on a CNC lathe. (Active from 2013 FA)	100.00%	0.00%
Students can access the proper toolpath to machine the part according to the blueprint. (Active from 2013 FA)	100.00%	0.00%
Students select the proper tool to machine their part on a virtual CNC lathe. (Active from 2013 FA)	100.00%	0.00%
Students can backplot instructor's part to see how long it will take to machine it on a CNC lathe. (Active from 2013 FA)	100.00%	0.00%
Students backplot their part to see how long it will take to machine it on a CNC lathe. (Active from 2013 FA)	100.00%	0.00%
Students modify the tool they used if they see a need for it. (Active from 2013 FA)	100.00%	0.00%
Students copy, offset, mirror or do whatever operation they can think of to create the part faster. (Active from 2013 FA)	100.00%	0.00%
Students can select the proper stock for simulation on a virtual CNC lathe. (Active from 2013 FA)	100.00%	0.00%
Students simulate their machining operations to check that the part is being cut correctly on the virtual CNC milling machine. (Active from 2013 FA)	100.00%	0.00%
Students post process the information for a specific CNC lathe to generate the G&M codes (Active from 2013 FA)	100.00%	0.00%
MTT60 - Advanced Machine Tool Concepts		
A. Identify the material specification that will give them properties about the material to machine. (Active from 2017 SP)	100.00%	100.00%
B. Determine the correct horsepower requirements given multiple factors to complete a job correctly. (Active from 2017 SP)	100.00%	100.00%
C. Prepare a written checklist of parameters to take into consideration while preparing a machining plan. (Active from 2017 SP)	100.00%	100.00%
MTT62 - Fixture Tooling		
Analyze whether the design and construction of a new a fixture is justified for a selected machining operation. (Active from 2013 FA)	100.00%	87.80%
Determine the correct cutting force requirements to select the proper fixture components. (Active from 2013 FA)	100.00%	86.59%
Prepare a written checklist of parameters to take into consideration while preparing the design of a fixture. (Active from 2013 FA)	100.00%	90.24%
MTT71 - MasterCam Multi-Axis Milling		
Know how to define differences between tool planes and construction planes (Active from 2018 FA)	100.00%	95.65%
Know how to orient part in various world coordinate systems (Active from 2018 FA)	100.00%	89.13%
MTT71 - Mastercam Multi-Axis Milling		
Student determine the correct multi-axis tool paths to complete a job correctly and simulate the chosen tool path correctly. (Active from 2013 FA)	100.00%	0.00%
Student set up the virtual machine correctly and produce a first article that is accurate and produce no collision. (Active from 2013 FA)	100.00%	0.00%
Students select cutting tools, feeds and speeds that are appropriate for the material machined and produce apart within appropriate time constraints. (Active from 2013 FA)	100.00%	0.00%
MTT72 - MasterCAM Multi-Axis Turning		

Course by SLO	Expected Performance	Performance
A. Select cutting tools, feeds, and speeds that are appropriate for the material machined and produce a virtual part within appropriate time constraints (Active from 2018 FA)	100.00%	95.83%
B. Determine the correct multi-axis tool paths to complete a virtual job correctly and simulate the chosen tool path correctly (Active from 2018 FA)	100.00%	95.83%
C. Set up the virtual machine correctly and produce a first article that is accurate and produces no collision (Active from 2018 FA)	100.00%	95.83%
MTT77 - GibbsCAM Turning		
Students can create basic geometry needed for machining on a CNC lathe. (Active from 2013 FA)	100.00%	100.00%
Students can access the proper toolpath to machine the part according to the blueprint. (Active from 2013 FA)	100.00%	100.00%
Students can modify toolpaths after simulated the machining on a virtual CNC lathe. (Active from 2013 FA)	100.00%	100.00%
Students can backplot instructor's part to see how long it will take to machine it on a virtual CNC lathe. (Active from 2013 FA)	100.00%	100.00%
Students know how to select the proper tool to machine part on a CNC lathe. (Active from 2013 FA)	100.00%	100.00%
Studens can modify the tool parameter if there is a need for it. (Active from 2013 FA)	100.00%	100.00%
Students can copy, offset, mirror or do whatever operation they can think of to create the part faster. (Active from 2013 FA)	100.00%	100.00%
Students can select the proper stock for simulation on a virtual CNC lathe. (Active from 2013 FA)	100.00%	100.00%
Students can simulate machining operations to check that the part is being machined correctly on the virtual CNC milling machine. (Active from 2013 FA)	100.00%	100.00%
Students can post process the information for a specific CNC lathe. (Active from 2013 FA)	100.00%	100.00%
MTT78 - Tool Building Using Verisurf		
Set tolerances and control feature projection (Active from 2019 SP)	100.00%	0.00%
MTT78 - Tool Building Using Verisurf		
Set tolerances and control feature projection. (Active from 2019 FA)	100.00%	0.00%
MTT110 - Industrial Maintenance of Machine Tools		
A. Identify the principal components of machine tools (Active from 2018 FA)	100.00%	100.00%
B. Determine the proper electrical load for machine tool operation (Active from 2018 FA)	100.00%	100.00%
C. Differentiate between different types of sub systems on machine tools (Active from 2018 FA)	100.00%	100.00%
D. Sketch the principal components of machine tools (Active from 2018 FA)	100.00%	100.00%
E. Compare and contrast manual versus CNC machine tool maintenance (Active from 2018 FA)	100.00%	100.00%
F. Compare preventive and curative maintenance of machine tools (Active from 2018 FA)	100.00%	100.00%
MTT168 - Advanced Computer-Assisted Inspection Using Verisurf		
Best-fit virtual models to captured data (Active from 2017 SP)	100.00%	52.63%
Measure the true position of holes (Active from 2017 SP)	100.00%	55.26%
Perform size inspections that are applicable to a specific problem (Active from 2017 SP)	100.00%	55.26%

Course by SLO	Expected Performance	Performance
Create reports of their measured data and compare it to virtual data (Active from 2017 SP)	100.00%	36.84%
Utilize laser tracker to inspect complex geometry (Active from 2017 SP)	100.00%	17.39%
Edit report objects for standardized output (Active from 2017 SP)	100.00%	55.26%
MTT170 - CNC Programming		
Students can identify the proper G&M codes related to the basic programming of CNC machines. (Active from 2013 FA)	100.00%	72.00%
Students determine the proper feed and speed to complete a job correctly. (Active from 2013 FA)	100.00%	72.00%
Students prepare a program to contour a simple part on a CNC mill (Active from 2013 FA)	100.00%	72.00%
MTT180 - Robotics for Computer Numerically Controlled Machines		
Students will machine a part of medium complexity on a CNC mill and use a robot to move the part from the CNC machine to an inventory location defined by the instructor. (Active from 2017 SP)	100.00%	60.36%
MTT180 - Robotics for Computer Numerically Controlled Machines		
Students will learn how to plan an automation project by differentiating between digital inputs/outputs and analog inputs. (Active from 2013 FA)	100.00%	92.86%
Students will learn mass properties of various objects. (Active from 2013 FA)	100.00%	82.65%
Students will program a close-loop control system. (Active from 2013 FA)	100.00%	84.69%
Students will program an open-loop control system. (Active from 2013 FA)	100.00%	87.76%
Students will describe the motions of a robot program. (Active from 2013 FA)	100.00%	72.92%
Students will machine a part of medium complexity on a CNC mill and use a robot to move the part from the CNC machine to an inventory location defined by the instructor. (Active from 2013 FA)	100.00%	83.33%
MTT278 - Mastercam Advanced		
Students can create a tool plane as needed in 3D space. (Active from 2013 FA)	100.00%	68.00%
Students can create 3D geometry necessary for machining a part. (Active from 2013 FA)	100.00%	76.00%
Students can modify 3D geometry as needed. (Active from 2013 FA)	100.00%	72.00%
Students can identify geometry on the blueprint to decide what toolpaths to use. (Active from 2013 FA)	100.00%	76.00%
Students can create surfaces needed for machining. (Active from 2013 FA)	100.00%	76.00%
Students can create solids using Boolean operations. (Active from 2013 FA)	100.00%	61.54%
Students can rough machine 3D parts. (Active from 2013 FA)	100.00%	65.52%
Students can finish machine 3D parts. (Active from 2013 FA)	100.00%	66.67%
Students can edit toolpaths to save time in 3D machining. (Active from 2013 FA)	100.00%	68.00%
Students can post process toolpaths for the proper CNC machine. (Active from 2013 FA)	100.00%	76.00%
MTT91L - CNC Mill Machining Laboratory		
Students produce an inspection report that describes both the measured dimensions and the methods of setup of the CNC lathe. (Active from 2013 FA)	100.00%	91.49%

Course by SLO	Expected Performance	Performance
Students determine the correct tool paths to complete a job correctly on the CNC milling machine and provide the correct program. (Active from 2013 FA)	100.00%	94.44%
Students setup the CNC mill correctly and produce a first article that is accurate according to the blueprint. (Active from 2013 FA)	100.00%	94.44%
MTT92L - Mastercam Laboratory		
Students are able to plan the sequence of operations to machine the part on MasterCam using the operations manager. (Active from 2013 FA)	100.00%	70.59%
Students can modify an operation using the operations manager. (Active from 2013 FA)	100.00%	70.59%
Students can create the geometry necessary to machine the part on MasterCam. (Active from 2013 FA)	100.00%	76.47%
Students know what tolerances are required for their finished part. (Active from 2013 FA)	100.00%	70.59%
Students find the information they need to select the proper drill before they tap a hole if required. (Active from 2013 FA)	100.00%	82.35%
Students setup the correct tools needed to machine their part on MasterCam. (Active from 2013 FA)	100.00%	82.35%
Students can decide if they need to machine the part in several operations. (Active from 2013 FA)	100.00%	70.59%
Students can use the help function of the software to find an answer to a common MasterCam problem. (Active from 2013 FA)	100.00%	76.47%
Students can find out how much time it will take to machine the part using the backplot function of MasterCam. (Active from 2013 FA)	100.00%	76.47%
Students know how to recognize a tool collision during the machining simulation. (Active from 2013 FA)	100.00%	76.47%
MTT93L - Virtual Gibbs Laboratory		
Students machine the part on the blueprint virtually with the most appropriate cutting tools. (Active from 2013 FA)	100.00%	100.00%
Students produce an accurately machined part with efficiency in mind. (Active from 2013 FA)	100.00%	100.00%
Students decide what geometry needs to be created for easy processing of operations. (Active from 2013 FA)	100.00%	100.00%
MTT96L - CNC Multi-Axis Mill Machining Laboratory		
Produce an inspection report that is complete and describes both the measured dimensions and the methods of setup (Active from 2017 SP)	100.00%	89.29%
Determine the correct multi axis tool paths to complete a job correctly and provide the correct program (Active from 2017 SP)	100.00%	71.43%
Setup the machine correctly and produce a first article that is accurate according to the blueprint (Active from 2017 SP)	100.00%	71.43%
MTT97L - CNC Multi-Axis Turning Laboratory		
A. Produce an inspection report that is complete and describes both the measured dimensions and the methods of setup (Active from 2019 SP)	100.00%	0.00%
Determine the correct multi-axis tool paths to complete a job correctly and provide the correct program (Active from 2019 SP)	100.00%	0.00%
Set up the machine correctly and produce a first article that is accurate according to the blueprint (Active from 2019 SP)	100.00%	0.00%
MTT - 50 - CNC Shop Math		
Students convert blueprint information necessary for machining from the Metric System to the standard system and vice versa. (Active from 2013 FA)	100.00%	70.00%

Course by SLO	Expected Performance	Performance
Students calculate the proper feed and speed for a machining operation and predict how long the cut will take. (Active from 2013 FA)	100.00%	75.00%
Students solve right angle triangles to find missing dimensions on a blueprint and setup gage blocks to verify accuracy once a part is machined. (Active from 2013 FA)	100.00%	70.00%
MTT - 51 - MasterCAM Milling		
Students can create basic geometry needed for machining on a CNC milling machine. (Active from 2013 FA)	100.00%	74.42%
Students can access the proper toolpath to machine the part according to the blueprint. (Active from 2013 FA)	100.00%	72.09%
Students can modify instructor's tool paths after verify simulation on a virtual CNC milling machine. (Active from 2013 FA)	100.00%	53.01%
Students backplot their part to see how long it will take to machine it on a CNC milling machine (Active from 2013 FA)	100.00%	66.07%
Students modify the tool parameters they used if they see a need for it (Active from 2013 FA)	100.00%	57.06%
Students modify their toolpaths after they simulate the machining on a virtual CNC milling machine (Active from 2013 FA)	100.00%	56.55%
Students modify the tool parameters they used if they see a need for it. (Active from 2013 FA)	100.00%	58.43%
Students select the proper stock for simulation on a virtual CNC milling machine. (Active from 2013 FA)	100.00%	77.91%
Students simulate their machining operations to check that the part is being machined correctly on the CNC milling machine (Active from 2013 FA)	100.00%	73.21%
Students post process the information for a specific CNC milling machine to generate G&M codes (Active from 2013 FA)	100.00%	65.06%
MTT - 52 - Setup & Op of Machinery		
Students know how to turn on the CNC milling machine safely. (Active from 2013 FA)	100.00%	88.24%
The students will be able to produce a workpiece within tolerances of the blueprint using a CNC miling machine and a CNC program of moderate complexity. (Active from 2013 FA)	100.00%	58.11%
Students setup the X and Y axis for their part on the CNC milling machine. (Active from 2013 FA)	100.00%	57.33%
Students setup several tool height offsets on the CNC milling machine. (Active from 2013 FA)	100.00%	54.67%
Students understand how to use an edgefinder. (Active from 2013 FA)	100.00%	63.67%
Students can retrieve programs from a USB drive and load them onto the CNC milling machine. (Active from 2013 FA)	100.00%	77.45%
Students simulate the program they will be running on the CNC milling machine. (Active from 2013 FA)	100.00%	72.37%
Students run the first article safely on the CNC milling machine. (Active from 2013 FA)	100.00%	68.21%
Students modify the speed and feed of the program using the controller if necessary. (Active from 2013 FA)	100.00%	57.82%
Students load tools properly in the tool holders. (Active from 2013 FA)	100.00%	72.70%
Students align a fixture if required for operation. (Active from 2013 FA)	100.00%	56.12%
MTT - 56 - CNC Shop Inspection (Distance Education)		
Analyze dial caliper measurements to ensure compliance with the blueprint. (Active from 2014 FA)	100.00%	82.64%

Course by SLO	Expected Performance	Performance
Analyze micrometer measurements to ensure compliance with the blueprint. (Active from 2014 FA)	100.00%	84.03%
Identify and select proper measuring instruments to meet blueprint accuracy requirement (Active from 2014 FA)	100.00%	82.64%
MTT - 57 - Setup and Operation of CNC Lathes		
Students know how to turn on the CNC lathe safely. (Active from 2013 FA)	100.00%	89.74%
Students setup the X and Z axis for their part on the CNC lathe (Active from 2013 FA)	100.00%	47.46%
Students use manual data input to face their part. (Active from 2013 FA)	100.00%	55.93%
Students understand how to modify their setup if the diameter of their part is too small or too large. (Active from 2013 FA)	100.00%	42.29%
Students can retrieve programs from a USB drive and load them onto the CNC lathe. (Active from 2013 FA)	100.00%	63.95%
Students run the first article safely on the CNC lathe. (Active from 2013 FA)	100.00%	50.18%
Students can run the first article safely on the CNC lathe. (Active from 2013 FA)	100.00%	50.52%
Students can modify the speed and feed of the program using the controller. (Active from 2013 FA)	100.00%	43.51%
MTT - 68 - Computer-Assisted Inspection Using Verisurf		
Perform size inspections using two planes. (Active from 2014 FA)	100.00%	74.26%
Determine the proper alignment by creating the appropriate targets. (Active from 2014 FA)	100.00%	57.43%
Perform a flatness inspection according to the blueprint (Active from 2014 FA)	100.00%	74.26%
MTT - 78 - Tool Building Using Verisurf		
Apply probe compensation to complex virtual models. (Active from 2016 FA)	100.00%	23.08%
Build complex assembly tooling and fixture. (Active from 2016 FA)	100.00%	26.92%
Learn how to set tolerances and control feature projection. (Active from 2016 FA)	100.00%	26.92%
Set up tools and apply inspection knowledge to physical models. (Active from 2016 FA)	100.00%	42.31%
MTT - 100 - Machine Tool Introduction		
Students can read the basic blueprints that were given to them in MTT 100 (Active from 2013 FA)	100.00%	68.64%
Students know what tools to use to machine the type of parts in MTT 100. (Active from 2013 FA)	100.00%	49.13%
Students understand the importance of safety in machine tool technology. (Active from 2013 FA)	100.00%	90.59%
Students set up basic feeds and speeds on their machine. (Active from 2013 FA)	100.00%	60.28%
Students understand that different materials require different feeds and speeds. (Active from 2013 FA)	100.00%	59.58%
Students use a dial caliper to measure the parts they made in MTT 100. (Active from 2013 FA)	100.00%	74.22%
Students can read a Vernier micrometer. (Active from 2013 FA)	100.00%	59.58%
Students can use a bandsaw to cut the raw material they need. (Active from 2013 FA)	100.00%	65.16%

Course by SLO	Expected Performance	Performance
Students can perform basic operations on the lathe. (Active from 2013 FA)	100.00%	61.15%
Students can perform basic operations on the mill. (Active from 2013 FA)	100.00%	62.64%
MTT - 94L - Manual Machining Lab		
Students produce an inspection report that describes both the measured dimensions and the methods of setup of the lathe and/or mill. (Active from 2013 FA)	100.00%	100.00%
Students determine the correct tool paths to complete a job correctly on the lathe and/or mill. (Active from 2013 FA)	100.00%	97.06%
Students setup the lathe and/or mill correctly and produce a first article that is accurate according to the blueprint. (Active from 2013 FA)	100.00%	100.00%
MTT - 95L - CNC Lathe Machining Laboratory		
Students produce an inspection report that describes both the measured dimensions and the methods of setup of the CNC lathe. (Active from 2013 FA)	100.00%	96.15%
Students determine the correct tool paths to complete a job correctly on the CNC lathe. (Active from 2013 FA)	100.00%	96.15%
Students set up the CNC lathe correctly. (Active from 2013 FA)	100.00%	92.31%
Students produce a first article that is accurate according to the blueprint. (Active from 2013 FA)	100.00%	95.65%

Assessment Report (Part 2: Assessment Responses) : Version by **Vo, Chuong** on **11/17/2021 08:01**

Explain the frequency (i.e., when and how often) and content of assessment process (e.g., planning, data collection, and results) for the program (e.g., department meetings, advisory boards, etc.). Also, describe the process for reviewing and discussing outcomes data.
The department assesses SLOs for every course every semester as they become available in eLumen. SLOs consist of detail-specific skills in measurement, programming, machine setup, and operations that students are expected to achieve at the end of the course. Faculty participation in SLO assessment is at 100%. SLOs are reviewed every two years and is approved by the advisory committee members from aerospace, defense, and consumer product companies. The advisory committee members meet twice every year to discuss industry needs and recommend expected skill set outcomes for students.

Average SLOs group by types:

- Student performance in Machining: 73.81%
- Student performance in Maintenance: 100 %
- Student performance in Programming: 80.15 %
- Student performance in Metrology: Overall: 52.95 %, without MTT 78: 60.66 %

Note: MTT 68 is a high-level, difficult course for most students
Describe the process for development of plan for improvement and summarize the changes that discipline faculty plan to implement based on the analysis of the student learning and program effectiveness. Provide specific examples.
Faculty discuss the overall results and identify necessary improvements to SLOs and revise student projects and assignments to incrementally improve student confidence and success.

Examples include:

- MTT 100 is the introductory course into Machine Tool Technology for new students. Students were typically introduced to traditional machining techniques like removing metal through subtractive processes. Faculty plan to introduce previews into broader manufacturing processes such as laser cutting, CNC, additive, and robotics control to enhance student knowledge and overall interest in Machine Tool Technology.
- Revised lab projects to provide tangible evidence of students' learning and progress. Students could manufacture their own products using techniques learned in class and bring them home. Having these projects provide physical evidence of student progress and learning helps to inspire their confidence and motivation in the program.
- The department will revise the requirements for the Coordinate Metrology Certificate of Achievement to address changes in industry and student needs. (Goal 2)

Data Analysis of Program Data : Version by **Vo, Chuong** on **11/17/2021 08:01**

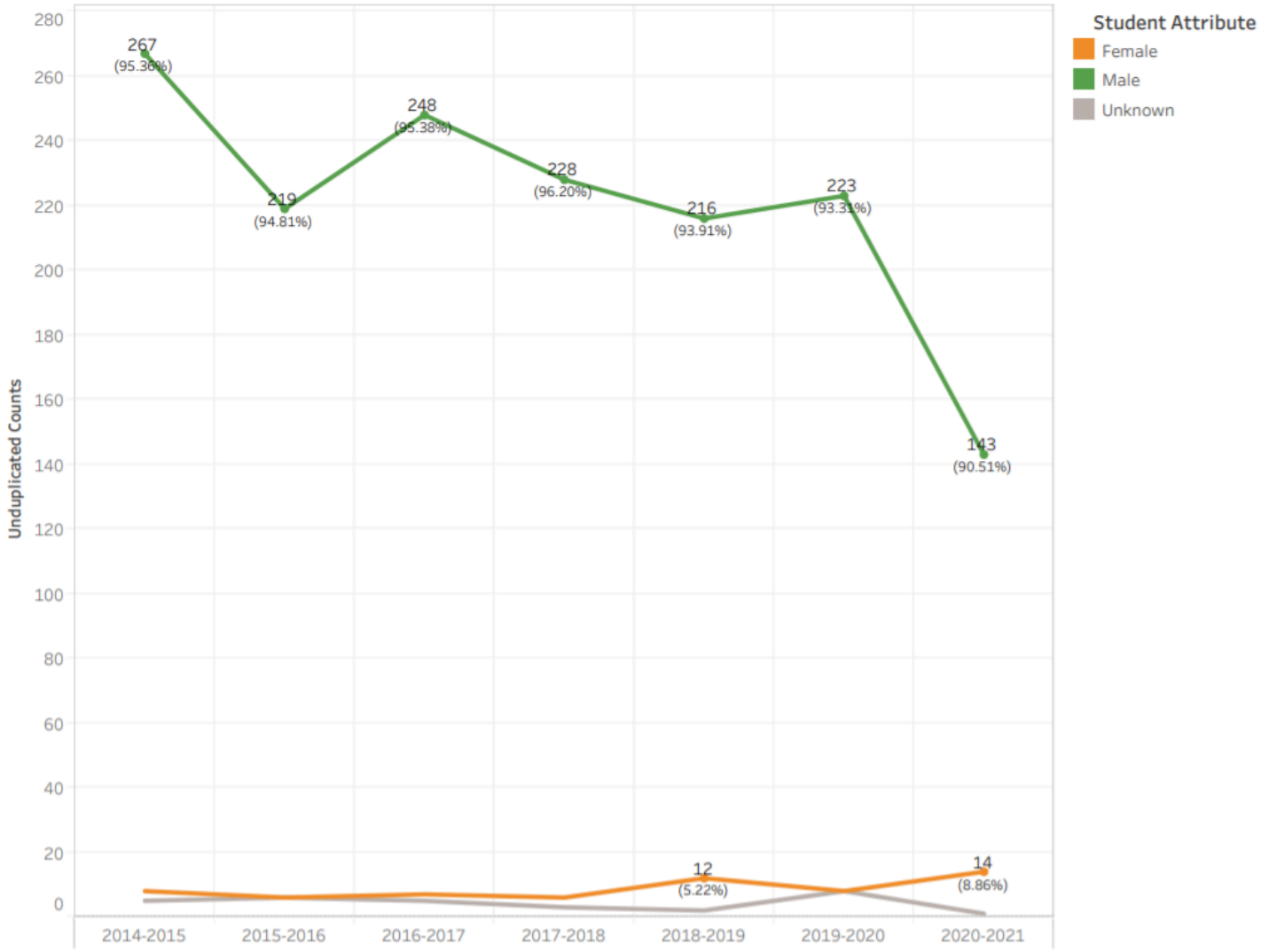
Describe your student demographics (race/ethnicity, gender, age, and others that might be relevant). Consider the following questions when writing your response:

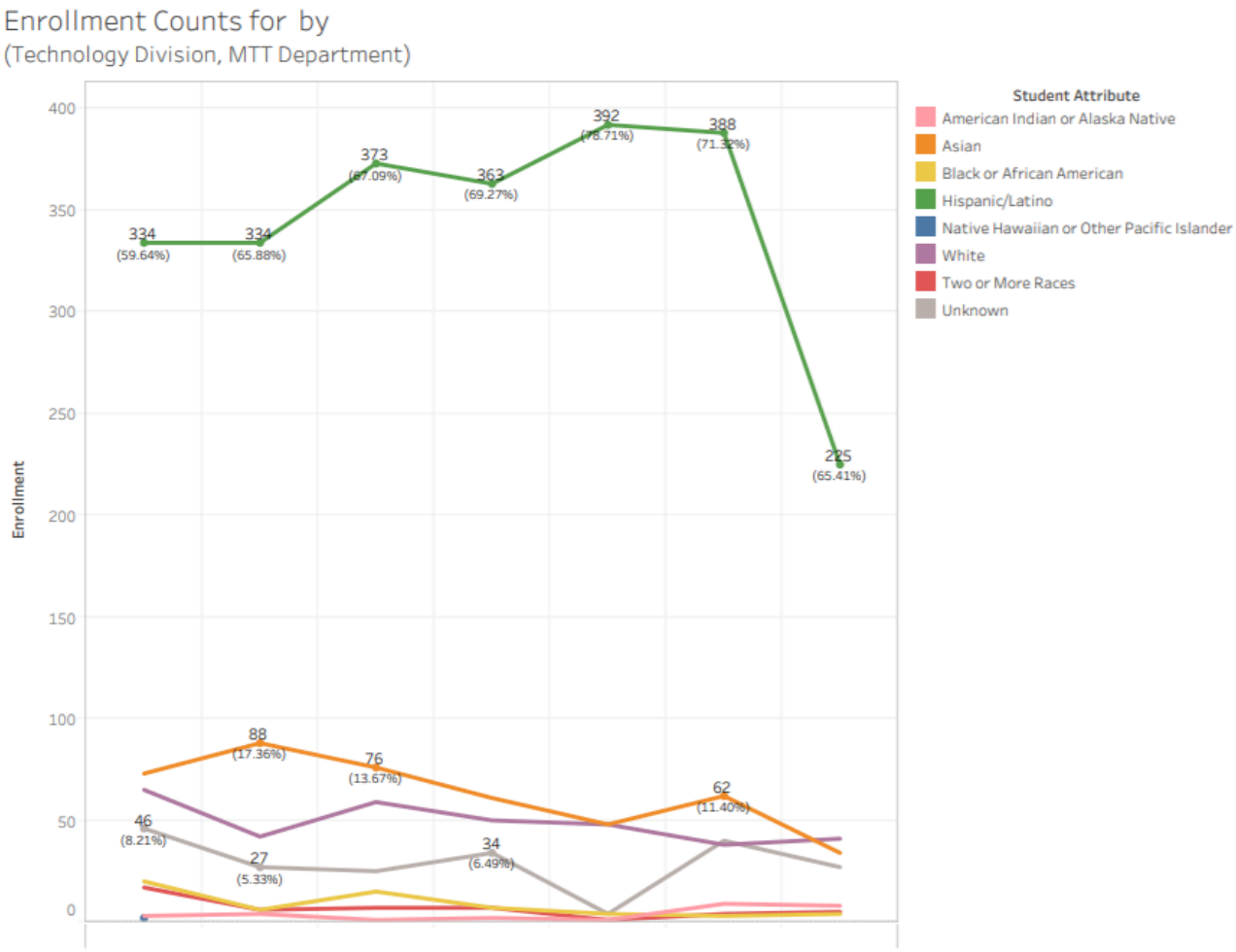
- How do the demographics of your program and its related courses compare with the college as a whole?
- Have they changed over time?

Year	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021
Headcount	280	231	260	237	230	239	158

Our headcount has fluctuated and declined since 2015 due to strong employment in the industry and the circumstances of COVID-19 in the last year. Our program has historically been and continues to be a male-dominated industry. Despite continued outreach efforts, female and non-traditional participation remains low.

Unduplicated Count for by
(Technology Division, MTT Department)





Enrollment count is determined by the number of enrollments with grade of A,B,C,D,F,P,NP,I*,IPP,INP,FW,W, or DR. Data was sourced from MIS and the Cerritos College Student Information System. Figures refer to credit students only. Race/ethnicity distributions will not match Data Mart due to a coding issue that was remediated locally.

With regards to race/ethnicity, the majority of MTT students identify as Hispanic. However, our representation with other ethnic groups has remained consistent since the last program review and is representative of similar proportions in our local region.

Headcount (unduplicated) and enrollment (duplicated) in the program. Consider the following questions when writing your response:

- Identify enrollment trends.
- Have there been an increase or decrease in enrollment in the last year?
- Are there differences in trends when you disaggregate the data (e.g., online versus face-to-face, demographics, special populations, etc.)?
- How will enrollment trends affect staffing decisions?

Enrollment trends follow employment trends and industry demands. Students come and go due to finding frequent employment from the program's courses. Students often take one or two courses before finding employment and come back within a few years to take courses as needed for their work. This last year's enrollment was lower than normal due to the emergence of COVID-19. Since MTT has traditionally been instructed through live hands-on instruction, adapting courses to hybrid status due to the pandemic was a challenge in 2020.
The department adjusts the section offerings as needed based on the number enrolled to ensure students can continue to study and complete their education with minimal interruptions. Currently, faculty reassignment is not a major problem since all faculty are qualified and capable of teaching multiple subjects within the department.

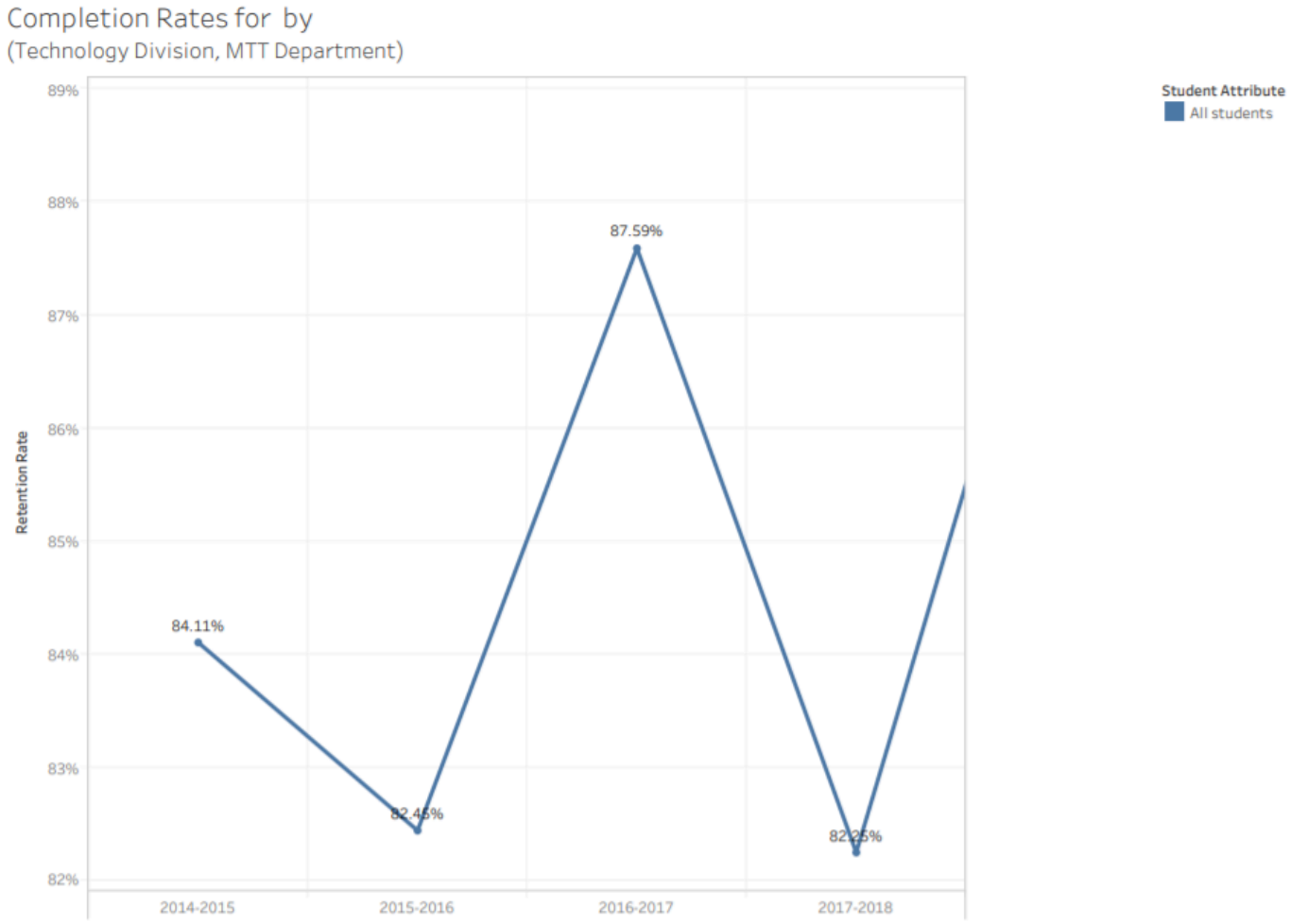
Year	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021
Headcount	280	231	260	237	230	239	158

Year	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021
Enrollment	560	507	556	524	498	544	344

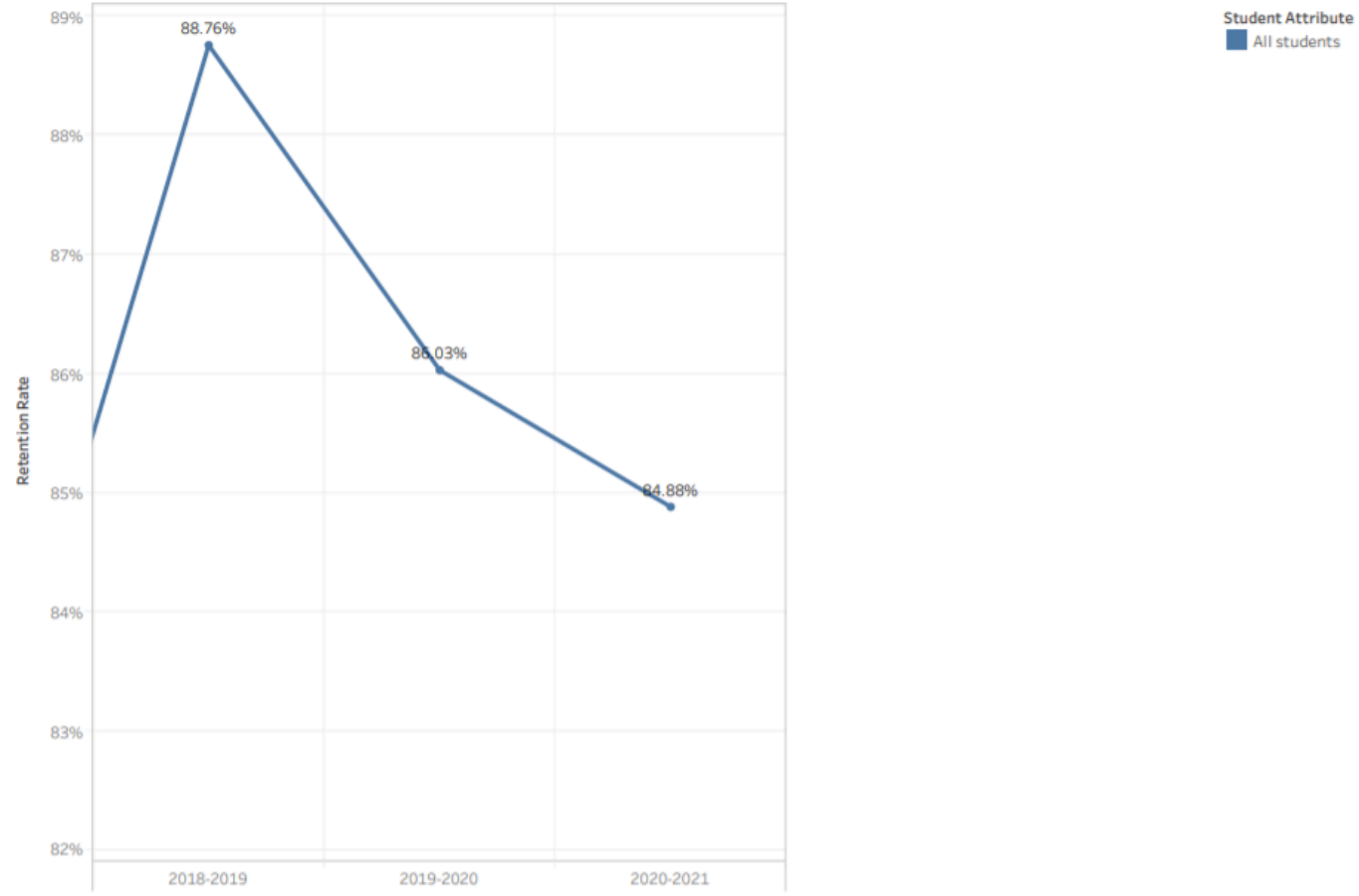
Discuss the program's success and retention rates, addressing any performance gaps if success rates are lower for disproportionately impacted students. Consider the following questions when writing your response:

- How have the success and retention rates changed over time?
- Are there particular courses that have particularly low rates and may prove a barrier to program completion?

The Department's overall retention rate over the current review period fluctuated between 82.25% and 88.76%.



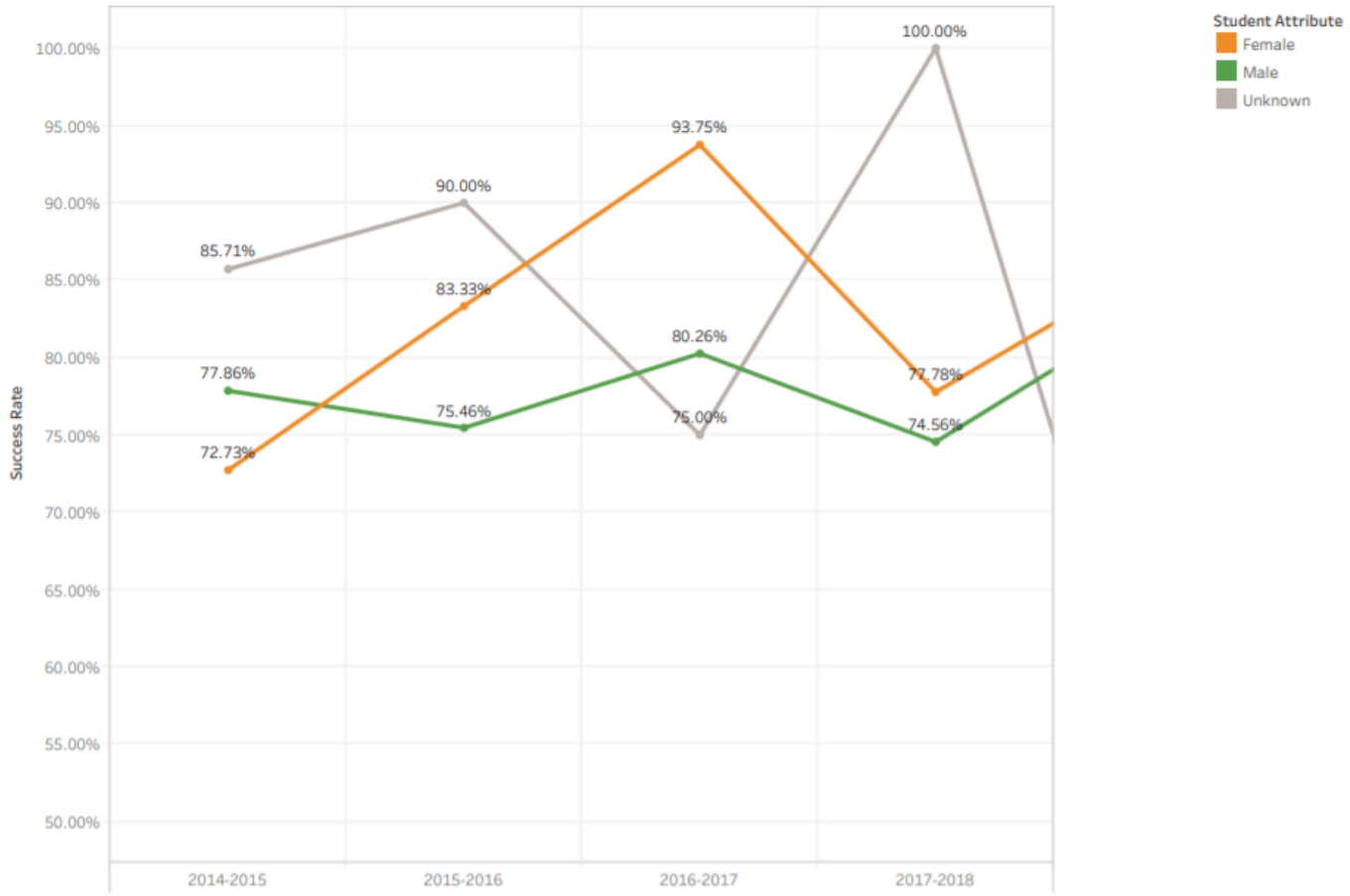
Success rate is determined by the number of enrollments with grade of A,B,C,P,IA,IB,IC, or IPP divided by the number of enrollments. Data was sourced from MIS and the Cerritos College Student Information System. Figures refer to credit students only. Race/ethnicity distributions will not match Data Mart due to a coding issue that was remediated locally.



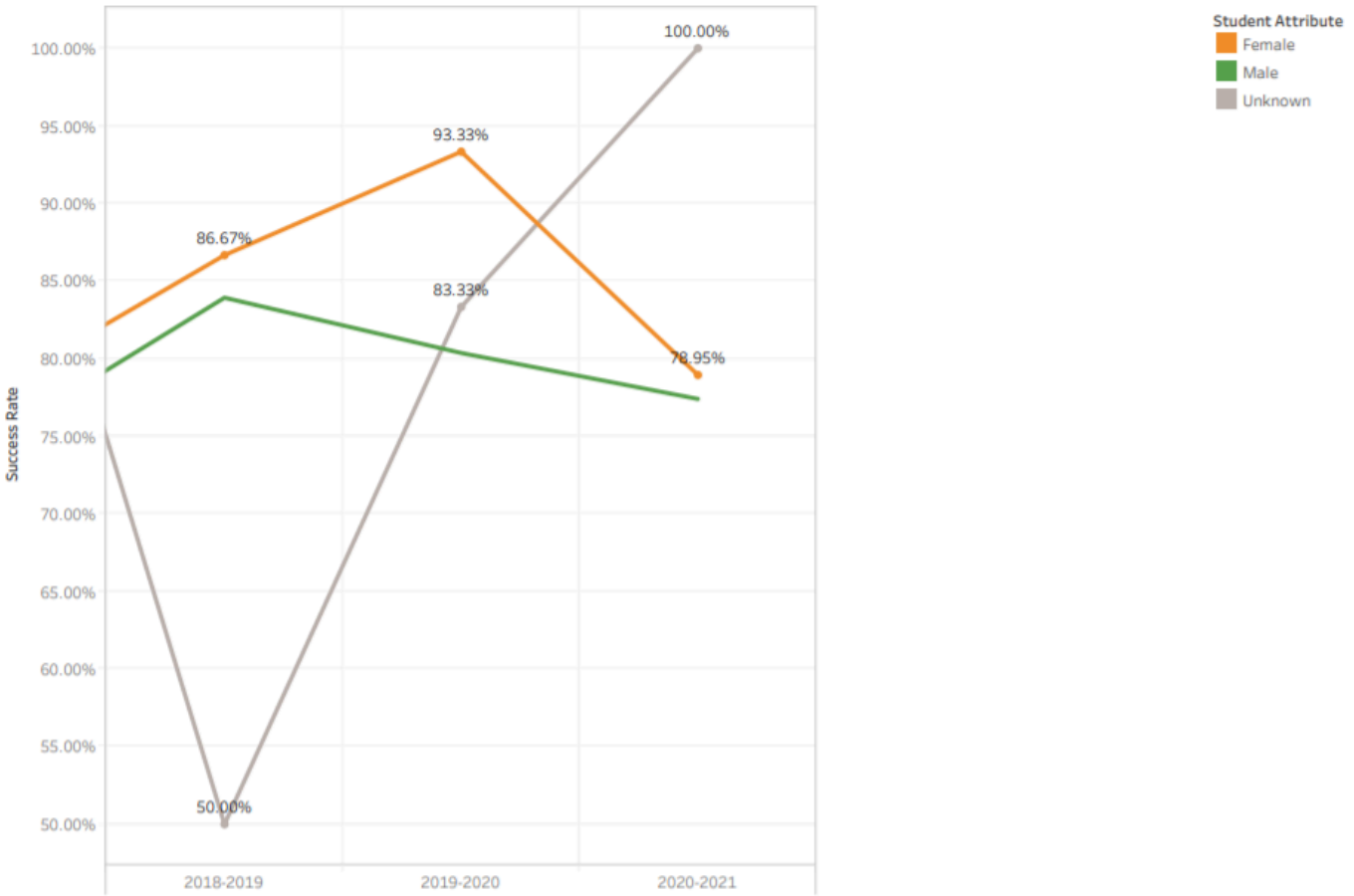
Success rate is determined by the number of enrollments with grade of A,B,C,P,IA,IB,IC, or IPP divided by the number of enrollments. Data was sourced from MIS and the Cerritos College Student Information System. Figures refer to credit students only. Race/ethnicity distributions will not match Data Mart due to a coding issue that was remediated locally.

Female success and retention rates were high across most courses despite low female participation since the last program review.

Success Rates for by
(Technology Division, MTT Department)



Success Rates for by
(Technology Division, MTT Department)

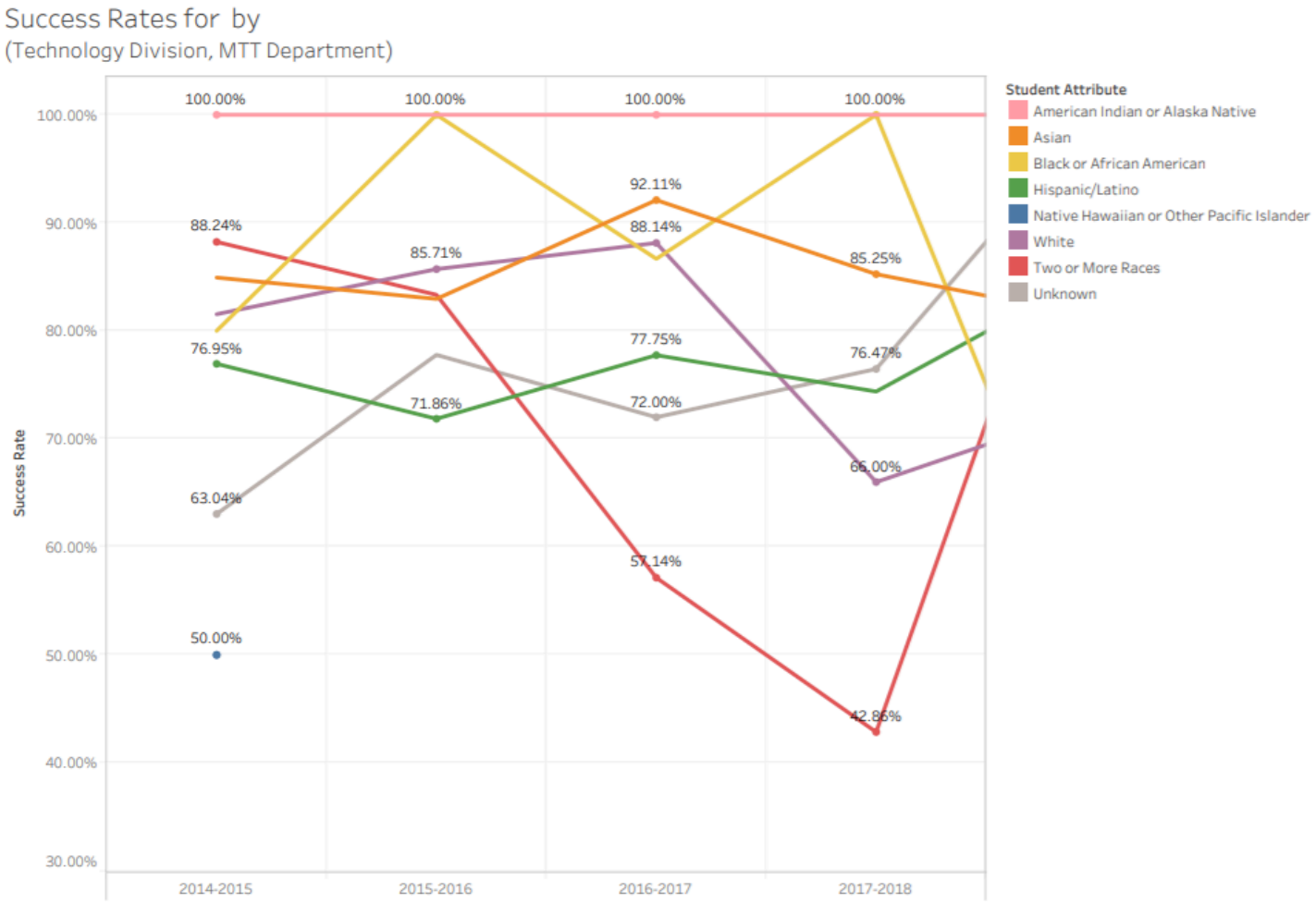


MTT 100 is the introductory course into the overall subject of Machine Tool Technology, therefore the success rate is lower compared to other classes as many students are exploring their options and are uncertain of their career paths at the time.

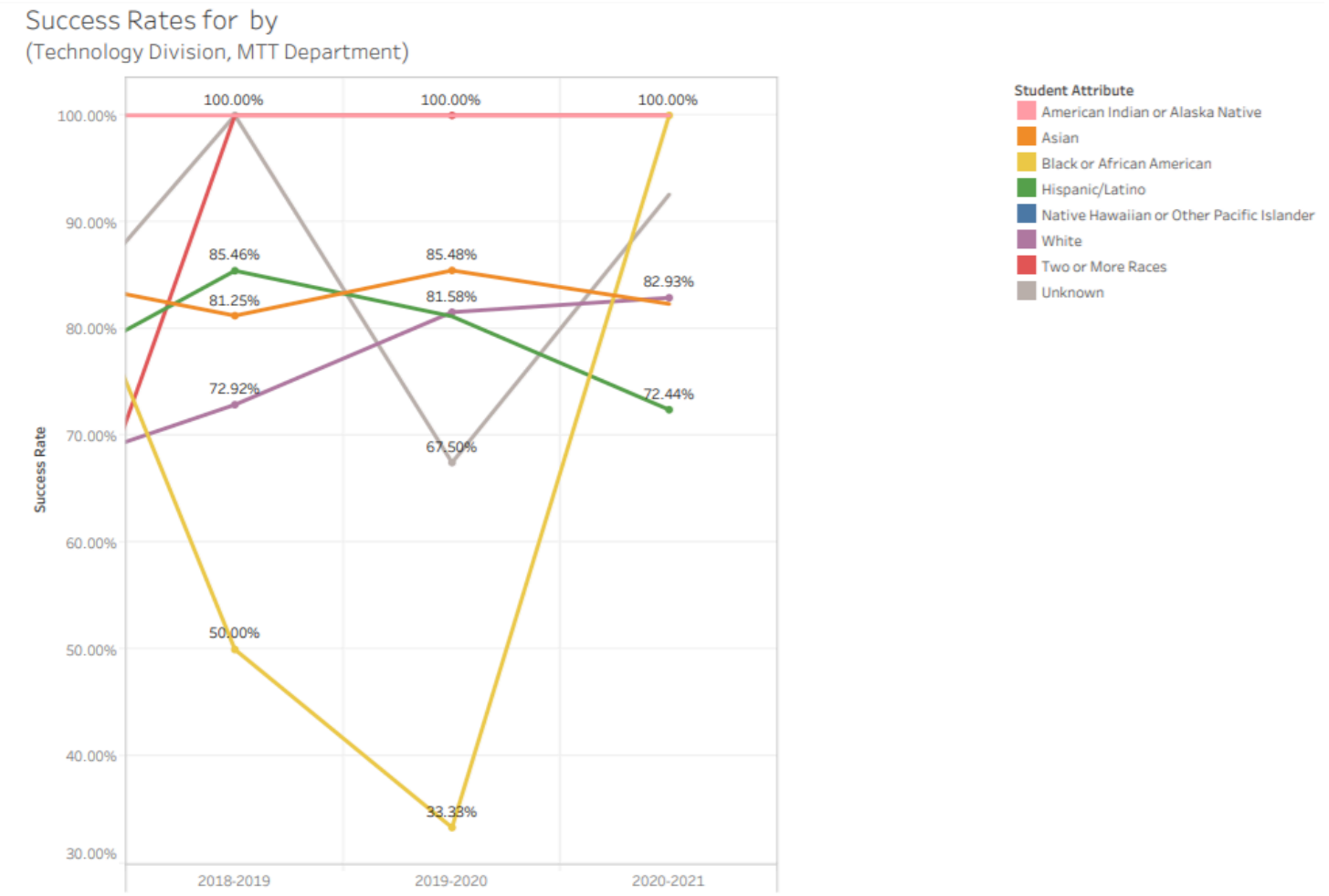
With regards to success and retention rates, what is the program doing or planning to do to close performance gaps and address student equity? Consider the following question when writing your response:

- Are there differences in success rates across delivery method (e.g., face-to-face compared to online)?

Hispanic and Asian student performance and success remained consistent over this review cycle. Performance fluctuations and gaps with certain ethnicities can be attributed to their very low headcount compared to the Hispanic majority. A few students failing to meet expected Student Learning Outcomes in those groups account for a much larger total percentage of their group compared to the same number in a Hispanic majority, therefore the success rates for them are skewed compared to the overall success rates of the program. For example, African-American students' success rate for 2018-2019/2019-2020 only factored for as few as 2 total students. The performance gaps with regards to race/ethnicity are further skewed when we consider how some Hispanic students might identify as two or more races. MTT will continue outreach efforts at the high school level, industry contacts and public networking to encourage a more diverse program.



Success rate is determined by the number of enrollments with grade of A,B,C,P,IA,IB,IC, or IPP divided by the number of enrollments. Data was sourced from MIS and the Cerritos College Student Information System. Figures refer to credit students only. Race/ethnicity distributions will not match Data Mart due to a coding issue that was remediated locally.



Success rate is determined by the number of enrollments with grade of A,B,C,P,IA,IB,IC, or IPP divided by the number of enrollments. Data was sourced from MIS and the Cerritos College Student Information System. Figures refer to credit students only. Race/ethnicity distributions will not match Data Mart due to a coding issue that was remediated locally.

Current performance gaps are directly related to the ongoing difficulties with COVID-19. Since Machine Tool Technology is heavily reliant on in-person instruction and equipment use, there were inevitable difficulties for both instructors and students to overcome while transitioning to online and distance-based education. These are only temporary obstacles as the program returned to on-campus instruction since Fall 2020. Therefore, success and retention should return to pre-pandemic level rates. In the future, the program is planning to adapt some courses into hybrid courses where lectures would be online, and the lab component would be held in person.
This course arrangement should attract more students, new as well as working people who want to study to improve their skill set, as they can attend online lectures at their convenience and only need to come to campus for hands-on practice with equipment in the lab.

Discuss conclusions drawn from the program data, assessments (SLOs), and/or other data. Indicate any specific responses or programmatic changes based on the data.
The Coordinate Metrology program will be revised due to a reassessment of current industry needs regarding the use of Inspection Methods, Techniques, and Reporting Standards. The current MTT 78 course has been observed to be too advanced for current continuing students. The skills taught within MTT 78 are now commonly acquired by students during their employment training in the industry.

The new Coordinate Metrology Certificate of Achievement retains the same 12 unit requirement as present. However, the course requirements will be resolved into:

- MTT 130 - Shop inspection systems and practice, 2 units
- MTT 131 - Geometric Tolerancing using Verisurf, 2 units
- MTT 132 - Fixture and Tool Building using Verisurf, 2 units
- MTT 133 - Applications of metrology using Verisurf, 1 unit
- MTT 111 - PLC in automated manufacturing, 2 units
- MTT 180 - Robotics for CNC Machines, 3 units
- MTT 130 will merge course content from MTT 56 and ENGT 116
- MTT 131 will merge course content from MTT 68 and ENGT 117
- MTT 132 will merge course content from MTT 62 and MTT 78
- MTT 133 will revise content from MTT 168 with additional focus on practical application.

The other change in course offerings is that MTT 71 and MTT 72 will be combined into a new course, MTT 279 Multi- Axis Programming, to improve student enrollment and retention. This will also shorten the time required for graduation since students often took one or the other, then took the second course much later (or not at all) due to suspending their education as they found and were busy with employment.

Due to the rapid pace of technological advancement, a significant need for highly-skilled workers in industry, the Advisory Board recommends that students should have instruction in multi-axis theory and machining as a standard requirement, so the department will combine the existing MTT 96L Multi-Axis Milling Lab, MTT 97L Multi-Axis Turning Lab and a new lecture component into a new course, MTT 280 Multi-Axis CNC Machining Setup and Operation.

Combining these courses will also address the issue of low enrollment in MTT 96L, MTT 97L, as well as helping students reduce their study time by one semester and consequently, prepare them to work in lucrative multi-axis machine setup positions sooner.

Curricular Course Review : Version by **Vo, Chuong** on **11/17/2021 08:01**

Provide the curriculum course review timeline to ensure all courses are reviewed at least once every six years.
All MTT courses were reviewed within the last six years in the following order:

- Spring 2017: 56, 70, 75, 76, 93L, 94L, 96L, 177
- Fall 2018: 110
- Spring 2019: 97L
- Fall 2019: 91L, 95L
- Fall 2020: 100
- Fall 2021: 51, 52, 57, 59, 62, 68, 71, 72, 78, 92L, 111, 112, 120, 168, 180, 278

Explain any course additions to current course offerings.
N/A
Explain any course deletions and inactivations from current course offerings.

- MTT 50 CNC Shop Math: Course content combined into the material of MTT 52 and MTT 57
- MTT 60 Advanced Machine Tool Concepts: Course content combined into the material of MTT 71 and MTT 72
- MTT 77 Gibbs Cam Turning: Low enrollment due to declining industry demand
- MTT 93L Virtual Gibbs Lab: Low enrollment due to declining industry demand
- MTT 170 CNC Programming: Course content combined into the material of MTT 52 and MTT 57

Discuss how well the courses, degrees, and/or certificates meet students' transfer or career training needs. Consider the following questions:

- Have all courses that are required for the program's degrees and certificates been offered during the last two years? If not, has the program established a course offering cycle?
- How has degree and/or certificate completion changed over time?
- Are there sufficient completers compared with the size of your program?

All courses were offered within the last two years as dictated by the Career Learning Pathways schedule.

Degree/certificate completion trends are tied to employment trends as mentioned in a previous question. The program has many students that take a few courses as needed for employment and eventually return to complete their degrees/certificates as they advance through their careers.

It is difficult to gauge sufficient completion as the program adequately prepares students for employment at any given point in time. MTT students are not typical college students that require a complete certificate or degree for employment opportunities.
Are any licensure/certification exams required for program completion or career entry?

- If so, what is the pass rate among graduates?
- Set an attainable, measurable goal for pass rates and identify any applicable performance benchmarks set by regulatory agencies.

Most employers do not require licensure or certification exams for employment. Many employers in the industry generally take students' specific course completion or completed certificates as adequate training, therefore the department does not track pass rates when the industry does not require it for employment. Students however, tend to return for additional certificates in other fields of Machine Tool Technology for additional career opportunities in the industry.

Program Reflection

Six-Year Program Reflection : Version by **Vo, Chuong** on **02/09/2022 02:29**

Provide an analysis of your program throughout the last six years, reflecting on student demographics and enrollment. Reflect on any changes you would like to see in your program in the next six years.

- The Program faces a barrier to overall student academic completion of the major due to the strong supply and variety of available industry jobs within the region. Students who have taken a few classes often end up in entry-level industry jobs and do not finish their degrees. Instead, former students often return in subsequent semesters for further additional education as needed to advance within their careers. Often, students will return to complete their certificates and degrees over time.
- The department will continue its efforts in outreach, to recruit and retain students and promote a culture of completion and graduation to all students, especially to women and younger students.
- The department will update the Metrology program to support students' hands-on instruction into the practical use of Metrology techniques and streamline their employment readiness in quality control.
- The program will expand Robotics instruction capability to better serve industry needs and prepare students for an automated future.
- The department will offer transferable hybrid courses with online lectures and on-campus labs to support students' needs in hands-on practicing with the lab's extensive equipment.

What is the six-year trend of degrees and certificates awarded? Is there anything you can do to help increase the number of students who acquire degrees and/or transfer?
The Department's total degrees and certificates awarded has increased since the previous program review except for the current year due to the exceptional circumstances of COVID-19. The new goal of making more courses eligible for transfer credit should incentivize more students into enrollment in the program since these educational credits are more valuable and allow them to complete their certificates or AA degrees, and to receive transfer credit for 4-year university courses. These courses will give students a clear path to direct and advance their education. However, many students find adequate employment during and after their completion of a certificate or an associate degree, so it remains an ongoing process to encourage students to advance their education to the 4-year level.

California Community Colleges Chancellor's Office

Program Awards Summary Report

	Annual 2014-2015	Annual 2015-2016	Annual 2016-2017	Annual 2017-2018	Annual 2018-2019	Annual 2019-2020	Annual 2020-2021
Cerritos Total	16	10	22	38	30	37	14
Associate of Arts (A.A.) degree	3	2	3	7	3	10	1
Certificate requiring 60+ semester units	2		1			1	
Certificate requiring 18 to < 30 semester units	11	8	18	29			
Certificate requiring 16 to fewer than 30 semester units					27	25	9
Certificate requiring 12 to < 18 units				2			
Certificate requiring 8 to fewer than 16 semester units						1	4

Report Run Date As Of : 10/21/2021 3:00:05 PM

Note: Although there are no Certificates in our program requiring 60+ semester units, there were likely students who applied for completion of multiple certificates at once which the reporting system somehow counted as a single certificate.

Were there any unplanned events (positive or negative) that affected your program? If so, what were they and how did they affect the program?
COVID-19 severely impacted our program's enrollment and instructional routine across multiple courses. Machine Tool Technology is heavily reliant on hands-on in-person instruction due to its machine-operated nature, so transitioning multiple courses from in-person to distanced based learning was an initial challenge. Faculty have successfully modified instructional delivery method and all courses have returned to in-person teaching with limited number students per COVID-19 safety protocol.
Please describe any recent achievements in your program by faculty and staff who have won awards or distinctions, new projects your program has implemented, committee work, professional development work, conference presentations, community engagement, or recently published work.

- The Cerritos MTT Program maintains the best equipped machine shop in the region in terms of quantity and quality in our community college region, this includes:
  - 4 robots to operate with for specialized instruction.
    - 2 of which are in Machine Tended Educational Cells (MTEC).
    - 2 of which are industrial robots to load parts onto dedicated CNC machines.
- Our Coordinate Metrology certificate is the first of its kind in the State of California.
- Full Time Faculty completed a degree in Workforce Development to better serve the program.
- Faculty renewed Manufacturing Engineering Certifications
- Established a new certificate for Industrial Technology Automated Manufacturing, the first of its kind in the region.
- 3 out of 4 faculty are fully Distance Education certified.

Provide a status update on goals from the last program review cycle.
Goal 1: Improve Program Enrollment and Increase Certificates of Achievement and Degrees

Status: Ongoing

Goal 2: Develop a pool of qualified candidates for part-time instructor positions

Status: Ongoing, difficult to find suitable candidates due to well paying full-time positions in industry and many professionals in the industry are not interested in teaching due to the added responsibility of student interaction during office hours and after class.

Goal 3: Revise and update multi-axis curriculum

Status: Ongoing, will rollover into a new goal of combining MTT 71 and MTT 72 into MTT 279. MTT 96L and MTT 97L will be combined into a new class MTT 280.

Goal 4: Improve Robotics instruction availability

Status: Ongoing, received new equipment but installation and instructor training is delayed due to Covid.

Goal 5: Expand student body diversity within the Department

Status: Ongoing

Goal 6: Develop and implement an alumni employment tracking database

Status: Ongoing, difficulty due to low student participation in reporting their employment status.

Goal 7: Seek additional funding for high tech equipment: Shrink Fit Tooling and Laser machine

Status: Partial completion, Shrink Fit Tooling System acquired and set up. Laser Machine needs upgrading, the MTT program currently shares an older machine with Engineering Design.
If applicable, describe the resources the program received from the last review cycle and the impact it had on the program?
Perkins and Strong Workforce grants enabled the department to:

- Replace obsolete conventional machines.
- Replace obsolete CNC machines with modern 3,4,5-Axis Milling Machine Centers with wireless touch probe capability.
- Acquire Multi-Axis Turning Centers with single setup Cylindrical Object Cutting and Milling capabilities.
- Acquire 2 Machine Tended Educational Cell (MTEC) for Robotics Instruction.
- Acquire an Automatic Part Loader(APL)/Cartesian Coordinate Robot to load parts into CNC Turning Centers.
- Acquire an Automatic Bar Feeder to CNC Chucker Lathe
- Acquire a FANUC (Factory Automation Numerical Control) Joint- Armed Robot to load parts into Vertical Machining Centers
- Acquire Shrink Fit Tooling Systems, and Tool Presetting systems for high speed machining

The impact of these resources has allowed the program to remain on the cutting edge of technology used in the industry and provide students ample training opportunities with modern automation practices and techniques. University students even attend our courses to gain exposure to our machines and practices.

Resource Requests

Faculty Resource Request(s) : Version by **Vo, Chuong** on **11/17/2021 08:01**

Hire another full-time faculty instructor.

Program/Department/Division:
Machine Tool Technology Department / Technology Division
Title of instructor position:
Machine Tool Technology Instructor - Full Time
Priority:

1. Critical (mission critical or must have)
2. Important (creates value and efficiency for program)
3. It can wait (would be nice if the money is available)

Priority 2
Is this position:

- New (not in the current budget)
- Replacement (in the current budget, currently vacant or will be vacant in the next budget year)
- Full-Time Temporary
- Conversion (grant to general fund)

New
Cost estimate:
$ 100,000 annually

Occurrence:

- Recurring expense
- One-time augmentation

Recurring Salary
Funding source:

- Instructional equipment
- Perkins
- Grants/contracts
- Vintage
- General fund (Program 100)
- Categorical – Equity
- Categorical – 3SP
- Categorical – Other
- Other funding

General fund
Provide a summary and rationale for this position. Explain how the position will help the program better meet its goals.
Hiring of another full-time instructor enables program flexibility distributing program instruction between two full-time faculty.
If this position is not filled, what is the potential impact to student success?
Difficulty executing program goals as intended and threat to program stability as it limits planned program expansion for student needs since the program currently has only one full-time faculty.

Classified Resource Request(s) : Version by **Vo, Chuong** on **11/17/2021 08:01**

Hire Laboratory Assistant

Program/Department/Division:
Machine Tool Technology Department/Technology Division
Position requested:
Laboratory Assistant
Priority:

1. Critical (mission critical or must have)
2. Important (creates value and efficiency for program)
3. It can wait (would be nice if the money is available)

Priority 2
Is this position:

- New (not in the current budget)
- Replacement (in the current budget, currently vacant or will be vacant in the next budget year)
- Full-Time Temporary
- Conversion (grant to general fund)

New
Cost estimate:
$14,000
Occurrence:

- Recurring expense
- One-time augmentation

Recurring expense

Funding source:

- Instructional equipment
- Perkins
- Grants/contracts
- Vintage
- General fund (Program 100)
- Categorical – Equity
- Categorical – 3SP
- Categorical – Other
- Other funding

General fund
Provide a summary and rationale for this position. Explain how the position will help the program better meet its goals.
Laboratory assistant would assist faculty with overall machine inventory inspection, maintenance, and preparation for student instruction and use.
If this position is not filled, what is the potential impact to student success?
The only current full-time faculty would have to spend additional time inspecting, maintaining and preparing machines for student instruction and use during and outside of class hours. The department has one of the largest overall machine inventories in our educational region for student learning.

Other Staffing Resource Request(s) (e.g., Manager, Confidential, etc.) : Version by **Vo, Chuong** on **11/17/2021 08:01**

n/a

Program/Department/Division:
n/a
Position requested:
n/a
Priority:

1. Critical (mission critical or must have)
2. Important (creates value and efficiency for program)
3. It can wait (would be nice if the money is available)

n/a
Is this position:

- New (not in the current budget)
- Replacement (in the current budget, currently vacant or will be vacant in the next budget year)
- Full-Time Temporary
- Conversion (grant to general fund)

n/a
Cost estimate:
n/a
Occurrence:

- Recurring expense
- One-time augmentation

n/a
Funding source:

- Instructional equipment
- Perkins
- Grants/contracts
- Vintage
- General fund (Program 100)
- Categorical – Equity
- Categorical – 3SP
- Categorical – Other
- Other funding

n/a
Provide a summary and rationale for this position. Explain how the position will help the program better meet its goals.
n/a
If this position is not filled, what is the potential impact to student success?
n/a

Professional Development Resource Request(s) : Version by **Vo, Chuong** on **11/17/2021 08:01**

Explain and justify the program's training and professional development needs. Explain how the training/professional development will help the program better meet its goals.
Training on new metrology and robotics equipment. Faculty requires training and practice on new machines intended for instruction and use in the upcoming revised Coordinate Metrology and Robotics programs.
Professional Development Resource Request(s):
Verisurf and Renishaw CMM training

FANUC and Haas Robotics training
Priority:

1. Critical (mission critical or must have)
2. Important (creates value and efficiency for program)
3. It can wait (would be nice if the money is available)

Priority 1
Cost estimate:

$5,000
Occurrence:

- Recurring expense
- One-time augmentation

One-time agumentation
Funding source:

- Instructional equipment
- Perkins
- Grants/contracts
- Vintage
- General fund (Program 100)
- Categorical – Equity
- Categorical – 3SP
- Categorical – Other
- Other funding

Grants

Facilities Resource Request(s) : Version by **Vo, Chuong** on **11/17/2021 08:01**

Identify and justify any facilities and equipment needs. Explain how it will help the program better meet its goals. If possible, indicate other disciplines who may share this space.

- Acquire a Hardness Tester for instruction in Material properties in Mold and Tool & Die Making
- Acquire high speed Micro Milling/Drill and Micro-Lathe machines
- Replace obsolete Optical Comparator with new machine to provide students training in modern inspection methods and technology used in industry
- Acquire a Vision Inspection System in order to provide students training with modern automated inspection methods and technology used in industry
- Acquire a CMM Master (Coordinate Measuring Machine) for new Coordinate Metrology goal
- Acquire three Articulated-arm portable CMMs for new Coordinate Metrology goal
- Setup Inspection Equipment and connect to CNC mills in a Machining Lab for new Coordinate Metrology goal
- Fabricate Plastic Injection Mold in collaboration with Plastics Manufacturing department for new planned goal of mold-making classes
- The program requires electrical hookups for new laboratory equipment to facilities in order to complete the hardware side of the goals for revising Coordinate Metrology and Robotics

What impact will this have on student success? What is the consequence of not getting this request fulfilled?
New and modern equipment encourages student motivation and enrollment as the department is seen as the most cutting edge program in the region. Not having this request fulfilled will impact student and industry perception of our use of relevant equipment for their needs.
Facilities Resource Request(s):
Electrical installation and hookup of new equipment to facility.
Priority:

1. Critical (mission critical or must have)
2. Important (creates value and efficiency for program)
3. It can wait (would be nice if the money is available)

Priority 1

- CMM Master (Coordinate Measuring Machine)
- 3 Articulated-arm portable CMMs
- Vision Inspection System
- Setup Inspection Equipment and connect to CNC mills in Machining Lab
- Fabricate Plastic Injection Mold in collaboration with Plastics Manufacturing

Priority 2

- Hardness Tester for Tool & Die Making
- Micro-Milling and Micro Lathe Machines
- Replacing Optical Comparator
- Electrical Hookup to Facility

Cost estimate:

- Hardness Tester for Tool & Die Making - $6,000
- Micro-Milling and Micro Lathe Machines - $10,000
- Replacing Optical Comparator - $8,000
- Vision Inspection System - $30,000
- CMM Master (Coordinate Measuring Machine) - $65,000
- Articulated-arm portable CMMs - $65,000 for 3
- Setup Inspection Equipment and connect to CNC mills in Machining Lab - $5,000
- Fabricate Plastic Injection Mold in collaboration with Plastics Manufacturing- $5,000
- Electrical Hookup to Facility - $10,000

Occurrence:

- Recurring expense
- One-time augmentation

One-time augmentation
Funding source:

- Instructional equipment
- Perkins
- Grants/contracts
- Vintage
- General fund (Program 100)
- Categorical – Equity
- Categorical – 3SP
- Categorical – Other

- Other funding

Grants

Technology and Software Resource Request(s) : Version by **Vo, Chuong** on **11/17/2021 08:01**

Identify and justify technology and software needs. Explain how it will help the program better meet its goals. If possible, indicate other disciplines who may share the technology and/or software.

n/a

What impact will this have on student success? What is the consequence of not getting this request fulfilled?

n/a

Technology and Software Resource Request(s):

n/a

Priority:

1. Critical (mission critical or must have)
2. Important (creates value and efficiency for program)
3. It can wait (would be nice if the money is available)

n/a

Cost estimate:

n/a

Occurrence:

- Recurring expense
- One-time augmentation

n/a

Funding source:

- Instructional equipment
- Perkins
- Grants/contracts
- Vintage
- General fund (Program 100)
- Categorical – Equity
- Categorical – 3SP
- Categorical – Other
- Other funding

n/a

Other Resource Request(s) : Version by **Vo, Chuong** on **11/17/2021 08:01**

Identify and justify any other needs. Explain how it will help the program better meet its goals.

n/a

What impact will this have on student success? What is the consequence of not getting this request fulfilled?

n/a

Other Resource Request(s):

n/a

Priority:

1. Critical (mission critical or must have)
2. Important (creates value and efficiency for program)
3. It can wait (would be nice if the money is available)

n/a

Cost estimate:

n/a

Occurrence:

- Recurring expense
- One-time augmentation

n/a

Funding source:

- Instructional equipment
- Perkins
- Grants/contracts
- Vintage
- General fund (Program 100)
- Categorical – Equity
- Categorical – 3SP
- Categorical – Other
- Other funding

n/a

Prioritized Resource Request Recommendations : Version by **Vo, Chuong** on **02/09/2022 02:29**

Resource request:	Priority:	Cost estimate:	Program goal alignment:
Hardness Tester for Tool & Die Making	2	$6,000	Collaborate with Engineering Design and Plastics Manufacturing Departments to develop mold making classes
Micro-Milling and Micro Lathe Machines	2	$10,000	Collaborate with Engineering Design and Plastics Manufacturing Departments to develop mold making classes
Replacing Optical Comparator	2	$8,000	Revise and update the Metrology Program to focus on Inspection Methods, Techniques, and Reporting Standards.
Vision Inspection System	1	$30,000	Revise and update the Metrology Program to focus on Inspection Methods, Techniques, and Reporting Standards.
CMM Master (Coordinate Measuring Machine)	1	$65,000	Revise and update the Metrology Program to focus on Inspection Methods, Techniques, and Reporting Standards.
3 Articulated-arm portable CMMs	1	$65,000	Revise and update the Metrology Program to focus on Inspection Methods, Techniques, and Reporting Standards.
Setup Inspection Equipment and connect to CNC mills in Machining Lab	1	$5,000	Revise and update the Metrology Program to focus on Inspection Methods, Techniques, and Reporting Standards.
Fabricate Plastic Injection Mold in collaboration with Plastics Manufacturing	1	$5,000	Collaborate with Engineering Design and Plastics Manufacturing Departments to develop mold making classes
Electrical Hookup to Facility	2	$10,000	Revise and update the Metrology Program to focus on Inspection Methods, Techniques, and Reporting Standards.
Hiring another Full-time Faculty	1	$100,000	Ensure program stability and having flexibility in executing program goals.
Hiring Laboratory Assistant	2	$14,000	Assist in lab preparation and equipment maintenance.
Training on new metrology and robotics equipment	1	$5,000	1. Revise and update the Metrology Program to focus on Inspection Methods, Techniques, and Reporting Standards. 2. Improve Robotics Instruction availability

Career Technical Education (CTE) Supplemental Questions : Version by **Vo, Chuong** on **11/17/2021 08:01**

How strong is the labor market demand for the program? Utilizing labor market data, describe changes in demand over the last six years and discuss the occupational outlook for the next six years.
According to the EMSI Report, job prospects seem bleak compared to the previous report in 2015. However, Advisory Committee feedback and industry contacts highly stress that they are in high demand for workers in the industry. The EMSI data is skewed because it includes unemployment data during the exceptional circumstances of Covid-19 in 2020.

There are current job postings on private sites such as Indeed that yield over 2700 jobs (at the time of this report) in machining related positions spread throughout Los Angeles and Orange County regions. The reality is that employers often contact the department (at least weekly) directly to post specific job openings.
How does the program address needs that are not met by similar programs in the college's region/service area? Identify and describe any distinctive component of the program and/or unique contributions.
In addition to traditional machining certificates, the program's offers unique certificates for:

- Coordinate Metrology
- Industrial Technology Automated Manufacturing

The program has the overall largest and most modern machine shop inventory in our local educational region, including:

- 22 Modern CNC Machines
- A Metrology Lab with 12 portable computerized inspection arms
- Robots with automatic part loader and bar feeder capabilities.

The program's vast inventory of machines provides exceptional exposure for students into a well rounded instruction of various machining processes that competing colleges cannot offer.

The department has a strong connection with its Advisory Board and industry contacts who often solicit students for job postings. (Often weekly postings and contact with program)
What is the success, completion, and employment rates for students in the program? Identify the standards set by the program for each metric and discuss any factors that may impact the metrics for students in the program. Based on the program's benchmarks, describe the status of any action plans for maintaining/improving the metrics.

California Community Colleges Chancellor's Office

Program Awards Summary Report

	Annual 2014-2015	Annual 2015-2016	Annual 2016-2017	Annual 2017-2018	Annual 2018-2019	Annual 2019-2020	Annual 2020-2021
Cerritos Total	16	10	22	38	30	37	14
Associate of Arts (A.A.) degree	3	2	3	7	3	10	1
Certificate requiring 60+ semester units	2		1			1	
Certificate requiring 18 to < 30 semester units	11	8	18	29			
Certificate requiring 16 to fewer than 30 semester units					27	25	9
Certificate requiring 12 to < 18 units				2			
Certificate requiring 8 to fewer than 16 semester units						1	4

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As mentioned above in a previous question regarding success, the program's students are not typical students that require completion of certificates or degrees to find employment. The department has difficulty tracking employment rates because students do not maintain contact with the program after connecting with an employer for their initial hiring. The few times a student reestablishes contact with the program are when they return for specific courses/certificates as required by their careers.

List any licensure/certification exam(s) required for entry into the workforce in the field of study and report the most recent pass rate(s) among program graduates. Identify performance benchmarks set by regulatory agencies and based on the program’s benchmarks, describe the status of any action plans for maintaining/improving the pass rates.

Most employers do not require licensure or certification exams for employment. Many employers in the industry generally take students’ specific course completion or completed certificates as adequate training, therefore the department does not track pass rates when the industry does not require it for employment. Employers often make direct contact with the department in order to solicit students for employment as mentioned above. Students however, tend to return for additional certificates in other fields of Machine Tool Technology for further career opportunities in the industry.