

MACHINE WELDING AND INDUSTRIAL MECHANICS



2019

ANNUAL REPORT OF PROGRAM DATA



UNIVERSITY of HAWAII®
HAWAII
COMMUNITY COLLEGE

1. Program Description

This program prepares the student for employment in the metalworking and mechanical/maintenance trades. Employment may be in construction, food processing, manufacturing, utilities, astronomical observatories, or related industries. The job requires good physical health, above average eye/hand coordination, mechanical reasoning, and good form perception and spatial relationship. Job responsibilities may include fabricating, repairing, or maintaining metal products on equipment, buildings, and systems.

Program Learning Outcomes (PLOs) for AY18-19

1. Demonstrate mechanical reasoning; form perception & spatial relations; numerical reasoning and communication skills as a part of the basic entry-level skills and knowledge to gain employment in the machining, welding, industrial mechanics or related fields.
2. Demonstrate the attributes of a good employee; good safety practices; positive work ethics; working collaboratively or independently under supervision; an awareness of hazardous materials and a responsibility for the orderliness and cleanliness of the workplace.
3. Demonstrate eye and hand coordination and dexterity in the proper set-up and use of the basic machine tools and equipment; metalworking equipment; the common welding & cutting processes; industrial mechanics equipment; material handling equipment and related machinery.
4. Demonstrate the applications of and the ability to use the common hand tools; layout tools; measuring tools; precision measuring tools; common cutting & forming tools, tools used with the common fasteners and specialty tools and the common metalworking and mechanic tools.
5. Demonstrate form perception and spatial relations in the applications of geometric construction; the three common methods of pattern development; industrial practices in framing and structural fabrication; practices in welding joint design & joint preparation and the common machine shop operations & practices.
6. Demonstrate the skills of a life-long learner; the ability to read blueprints; knowledge of metals and the common materials and supplies; the ability to do the work-related math; the ability to communicate and read technical resources.

2. Analysis of the Program

The program's Demand indicator shows the program's health call to be "Healthy" with 81 new and replacement positions in the State and 8 new and replacement positions in the County (Prorated). In addition to existing workforce opportunities, we for see a need for all types of industrial welders, fabricators, mechanics, machinists, and maintenance workers in the future as the Big Island's energy infrastructure continues to grow and evolve. We will continue to track our graduates in their employment endeavors after they leave the College and to keep records of the multiple companies that request our help in filling positions with our students. Currently, this includes the Keck Observatory, Subaru, Hilo Mechanical, Industrial Iron Works and United Laundry Linen.

The health call for the Efficiency indicator is currently "Healthy" with a fill rate of 65.9%. Over the last three years, this indicator sharply increased from AY16-17 to AY17-18, while the AY 18-19 rate is slightly lower than the AY16-17 rate. The program is looking into the reasons for the decrease in this Efficiency indicator. Even though the call is still "Healthy," the instructors feel that there may be multiple external factors such as the economy and the 2018 lava flow for the downward shift in AY18-19. The number of Majors adjusted between the three years in the same pattern, but the "Majors to FTE BOR Appointed Faculty" ratio now is 15.

The health call of the program for the Effectiveness indicator is currently "Cautionary." We have an 81% persistence from the Fall to Spring, which is an increase of 7% when compared to the AY 16-17 year and equivalent to the AY 17-18. The program also has a 100% completion rate with zero withdrawals. The successful completion rate is up 4% from 96% to 100%, but the health call is "Cautionary" due to the number of degrees and certificates awarded, which decreased from 26 in AY 17-18 to 18 in AY 18-19. Although the number of degrees decreased as a direct result of enrollment numbers slightly decreasing, the program is happy to report a high number of Native Hawaiian enrollment, and 30% of all degrees and certificates awarded to Native Hawaiian students.

The overall health of the program is "Healthy." Our students are finding work in sheet metal, fabrication, industrial mechanics and machining as well as welding positions. We anticipate our demand indicator to stay "Healthy." Our efficiency indicator is also "Healthy" and we hope to stay Healthy with anticipation of the class sizes and fill rate increasing. Our Effectiveness indicator is "Cautionary" and we anticipate this indicator to become Healthy as local employers have an increased need for skilled graduates who have earned degrees or certificates.

Perkins Indicators		Goal	Actual	Met
29.	1P1 Technical Skills Attainment	93	100	Met
30.	2P1 Completion	55	45.45	Not Met
31.	3P1 Student Retention or Transfer	81.9	66.67	Not Met
32.	4P1 Student Placement	66.25	46.67	Not Met
33.	5P1 Nontraditional Participation	23.5	11.9	Not Met
34.	5P2 Nontraditional Completion	23	12	Not Met

In the 2017-18 year, the Perkins Core Indicator 1P1 Technical Skills Attainment was met with a 100.00 score and a goal of 93.00. This score shows that every student in the program received a 2.0 or better in the CTE courses that they were taking.

The Perkins Core Indicator 2P1 Completion, we did not meet with a score of 45.45. The goal was 55 and we did not meet this indicator by 9.55. We did meet this goal the two previous years, AY 16-17 and AY 17-18, and believe that this is a reflection of the economic state of the island due to the 2018 lava flow and the loss of business.

The Perkins Core Indicator 3P1, Student Retention or Transfer for the 2015-16 year, the data shows that we did not meet with a score of 66.67. The goal was 81.9. We hope to meet this goal in AY 19-20 year, as it was not met in the AY 16-17 year by 4.54 points. This year we missed the goal by 15.23 points. As stated above, we believe that the lava flow contributed to the decline of this performance indicator.

The Perkins Core Indicator 4P1, Student Placement data was pulled from the 2017-18 year and shows that we did not meet with a score of 46.67. The goal was 66.25. This data is believed to be flawed because the program can only use one CIP code. The program teaches students to weld (CIP 48.05.08), machine (CIP 48.05.01), sheet metal (CIP 48.05.06) and computer numeric controls (CIP 48.04.10), but we are given the one CIP for welding. We are currently tracking our students work placement to show that there are more jobs available for our graduates than the data suggests. The program believes that this indicator will be met in upcoming AY 19-20 when the CIP code is changed to reflect the actual available jobs that are available to graduating students.

For the Perkins Core Indicator 5P1, Nontraditional Participation, the goal was 23.50 and the actual was 11.9. The goal for the Perkins Core Indicator 5P2, Nontraditional Completion, was 23.00 and was also not met with a 12.00 score. Although both of these indicators were not met, both scores went up significantly compared to the previous year

where the 5P1 had 6.49 score and the 5P2 had a 4.55, showing that this indicator has improved. The Perkins Core Indicators 5P1 and 5P2, Nontraditional Participation and Nontraditional Completion, have historically been a challenge and we are currently emphasizing recruitment of non-traditional students by going to job fairs and talking to non-traditional students. We also hired a permanent female APT in Fall 2016 and she has been active in encouraging prospective non-traditional students to visit our booth and displays. We will continue to look for opportunities to recruit non-traditional students to our program.

There are no new certificates or degrees for the MWIM program, although the total number of units required to graduate was reduced by 2 units when the new blueprinting class, BLPR 50 for Welding and Machining, replaced both BLPR 30B for Welders and BLPR 30D for Machine Trades. BLPR 50 is a 4-unit course, the older two courses were 3 units each. These changes were proposed in the Fall of 2018, approved in Spring 2019, and will take effect Fall 2019.

An 8 week course on basic CAD was offered to the MWIM students by AEC Instructor Donna De Silva in Spring 2019 in order to assist first year students that wanted to get a step-up on the course curriculum for the upcoming semester's MWIM 72, Introduction to CNC Milling I, as well as a basic understanding of the fundamentals of running the operating system of the newly acquired 500-watt laser cutting machine. Six students attended the course that Instructor De Silva offered at no charge.

The APT for the MWIM and DIMC programs left the College at the end of the Spring 2019 semester. The program is concerned that with the lack of the APT's assistance in all areas of the program from acquiring equipment through grant writing, networking in the community, to all aspects of student involvement including curriculum, shop safety, and general assistance with registration and career assistance for students, as well as general administrative duties, the program will undergo added stress and additional time constraints and the instructors will be unable to fulfill these duties.

The following is the list from the AY 217-18 annual report of the anticipated action plan for AY 2018-19.

- 1. Continue to recruit non-traditional students.*
- 2. Schedule and arrange training for the CNC Milling Machine upgrades.*
- 3. Schedule and arrange training for the laser cutter that is arriving summer 2018.*
- 4. Finish re-writing the new CLOs and edit all assessments and rubrics, and re-align with the new CLOs align to the PLOs and ILOs.*
- 5. Edit and revise all assessments and rubrics for Fall 2019 when the new CLOs have hopefully been approved.*
- 5. Allow students to work on additional projects independently.*

1. In response to the prior year's action plan, the MWIM program is pleased with the results of the non-traditional enrollment, which continues to increase at a steady rate. In the Fall 2018 and Spring 2019, there was 1 female student out of 18 returning students from previous year. When looking at the first-year students, incoming to the Fall of 2018, semester, there were 12.5 % or 2 out of 16 students who were female, and in the Spring of 2019, there were 25% or 3 out of 12 students who were female.
2. The training for the CNC Milling machine upgrades took place in March of 2019. In attendance were both MWIM instructors, Darrell Miyashiro and Camelo Ducusin, as well as the APT, Jennifer Siemon.
3. The scheduled training for the 500-watt laser cutter which arrived in Fall 2018 took place in Spring 2019. In attendance were the MWIM instructors and the APT for MWIM as well as Donna De Silva, instructor for the Blueprint for Machining and Welding courses.
4. The MWIM program CLOs and PLOs were rewritten and realigned and then realigned to the ILOs. The proposal for these changes were submitted in Fall 2018 and approved in the spring 2019 and will take effect Fall 2019.
5. The revised assessments and rubrics which reflect the newly written CLOs and PLOs have not been completed, and the instructors anticipate their edits to be complete in Fall 2019.
6. For the machining courses, the instructor will support students that are caught up with their assignments and are competent in the techniques being taught and will allow them to work on smaller projects independently. Some of the more advanced students have shown interest in making tools, such as hammers, and the instructor is going to allow them to pursue these projects and hopes that this will be a motivating factor for doing well in the course and learning more machining skills. This was done as a trial, and the instructor monitored the students that fabricated other projects to ensure that projects were not rushed and did not interfere with their assignments.

3. Program Student Learning Outcomes

a) Program Learning Outcomes (PLOs) for AY18-19

1. Demonstrate mechanical reasoning; form perception & spatial relations; numerical reasoning and communication skills as a part of the basic entry-level skills and knowledge to gain employment in the machining, welding, industrial mechanics or related fields.

2. Demonstrate the attributes of a good employee; good safety practices; positive work ethics; working collaboratively or independently under supervision; an awareness of hazardous materials and a responsibility for the orderliness and cleanliness of the workplace.
3. Demonstrate eye and hand coordination and dexterity in the proper set-up and use of the basic machine tools and equipment; metalworking equipment; the common welding & cutting processes; industrial mechanics equipment; material handling equipment and related machinery.
4. Demonstrate the applications of and the ability to use the common hand tools; layout tools; measuring tools; precision measuring tools; common cutting & forming tools, tools used with the common fasteners and specialty tools and the common metalworking and mechanic tools.
5. Demonstrate form perception and spatial relations in the applications of geometric construction; the three common methods of pattern development; industrial practices in framing and structural fabrication; practices in welding joint design & joint preparation and the common machine shop operations & practices.
6. Demonstrate the skills of a life-long learner; the ability to read blueprints; knowledge of metals and the common materials and supplies; the ability to do the work-related math; the ability to communicate and read technical resources.

b) PLOs assessed in AY18-19:

The program had completed its full five-year cycle of assessment for all courses as of Spring 2017 and the program is currently up-to-date with all assessments completed in the last four years. The program's assessment cycle will resume in Fall 2019 with new Initial assessments of MWIM 42, 45, 62 and 65. See the program's assessment schedule on the College's online [ASSMT SCHEDULES for PROGRAMS & COURSES](#).

The data graph below shows the program's AY16-17 PLO assessment results. The changes noted in part "d" below are based on these and previous years' results.

**DISL Program
AY18-19 Assessment Results**

Dark Green = Exceeds // Light Green = Meets // Orange = Partly Meets // Red = Does not Meet

The screenshot shows the OMS interface for the Machine Welding & Industrial Mechanics program. The sidebar on the left lists organization units and courses. The main area displays the following PLOs:

- MWIM_PLO1:** Demonstrate mechanical reasoning; form perception and spacial relations; numerical reasoning and communication skills as a part of the basi...
- MWIM_PLO2:** Demonstrate the attributes of a good employee; Good safety practices; positive work ethics; working collaboratively or independently under...
- MWIM_PLO3:** Demonstrate eye and hand coordination and dexterity in the proper set-up and use of the basic machine tools and equipment; metalworking equ...
- MWIM_PLO4:** Demonstrate the applications of and the ability to use the common hand tools layout tools; measuring tools; precision measuring tools; comm...
- MWIM_PLO5:** Demonstrate form perception and spatial relations in the applications of geometric construction; the three common methods of pattern develo...
- MWIM_PLO6:** Demonstrate the skills of a life-long learner; the ability to read blueprints; knowledge of metals and the common materials and supplies; t...

c) see (b) above

d) Results of assessments:

As stated in this report, the previous cycle's assessment results, successes and challenges are being addressed. Rubrics are in the process of being edited and all CLOs for all program courses have been re-written and re-aligned to the program's newly revised PLOs, all of which are in place for Fall 2019. Faculty will continue to go to assessment workshops, and student learning outcomes results will be analyzed in consultation with graduates and industry.

Revised MWIM PLOs, approved for Fall 2019

MWIM PLO1: Demonstrate the attributes of a good employee including good safety practices; good communication skills; positive work ethics; working collaboratively or independently under supervision; being a life-long learner; demonstrating an awareness of hazardous materials; and taking responsibility for the orderliness and cleanliness of the workplace.

MWIM PLO2: : Demonstrate and be able to apply the proper set-up and use of basic machine tools and equipment; metalworking equipment; common welding and cutting

processes; industrial mechanics equipment; material handling equipment and related machinery; and entry-level ability to interpret blueprints.

MWIM PLO3: Demonstrate and be able to apply mechanical reasoning, form perception and spatial relations, and numerical reasoning skills as a part of the basic entry-level skills and knowledge necessary to gain employment in the Machining, Welding, Industrial Mechanics or related fields.

4. Action Plan

1. The Perkins Core Indicator 2P1, Completion, and the Perkins Core Indicator 3P1, Retention or Transfer, were not met. The program expects that there will continue to be a high need for skilled workers in the field. Currently, many businesses are temporarily employing workers from the mainland to fulfill positions. Instructors will work closely with potential employers, the community and the Advisory Council to ensure that our students have the needed skills for employment throughout the industry upon graduation. There will be increased motivation for students to complete the program because of the communication with these employers who will be invited to visit the program and develop a relationship with the instructors and students.

2. Student Placement, Perkins Core Indicator 4P1, was not met, but this data is believed to be flawed because the program can only use one CIP code. The program teaches students to weld (CIP 48.05.08), machine (CIP 48.05.01), sheet metal (CIP 48.05.06) and computer numeric controls (CIP 48.04.10), but we are given the one CIP for welding. We are currently tracking our students work placement to show that there are more jobs available for our graduates than the data suggests. As stated above, we will continue to track our graduates in their employment endeavors after they leave the College and to keep record of the multiple companies that request our help in filling positions, such as Keck Observatory, Subaru, Hilo Mechanical, Industrial Iron Works, and United Laundry Linen.

3. Regarding the 5P1 and 5P2 Perkins Core Indicators that were not met, the program feels that there is a trend toward increasing our percentages and we are getting closer to meeting these benchmarks. Non-traditional participation is a continuous and ongoing challenge for the MWIM program. The program is addressing the low-enrollment of non-traditional students by going to job fairs and career days at various high schools and elementary schools as well as hosting HCC Day here on campus with at least one female student to represent the program. The program encourages nontraditional students and female involvement in the trades. We hope to see an increase in nontraditional participation and completion for the Perkins Core Indicators over the next couple of years.

We do not anticipate meeting the 23.00 goal in the next year but anticipate closing the gap. We cannot predict that industry will accept females on an equal basis as males, but there is more interest in our program at job fairs and on career days from prospective female students and recently, younger females from the elementary schools that we have visited. Although we anticipate that these Perkins Indicators will improve, we cannot predict when they will be met. We will continually strive to support and improve non-traditional enrollment and completion.

4. The program will edit and revise all assessments for the Fall 2019 and continue to work with the Institutional Assessment Coordinator in streamlining and organizing assessment rubrics so that they are consistent and accurately reflect student achievement of the CLOs, and so that assessment strategies are concrete for the next set of assessments which start in Fall 2019. The overall results of these clearly defined rubrics will assist the instructor and the Advisory Council in analyzing where any weaknesses in instruction or gaps in student learning outcomes exist. We had planned to have these edits finished and approved by the Advisory Council by the end of summer 2018 but are still working on them and hope to finish in Fall 2019. The program will continue to work with the Institutional Assessment Coordinator to ensure that the rubrics are accurate and clear and reflect student learning outcomes as well as the alignments to the CLOs and PLOs and that we are meeting our goals.

5. In regards to the machining courses, the instructors will support students that are caught up with their assignments and are competent in the techniques being taught and will allow them to work on smaller projects independently. This goal was set in AY 17-18 and was a success. The more advanced students showed interest in making tools, such as hammers, and the instructor allowed these students to pursue these projects. This proved to be a motivating factor and supported students by allowing them to learn more machining skills. This was done as a trial and the instructors were satisfied to report that the additional assignments did not interfere with the priority assignments. The instructors will continue to support students that are able to work more independently and will monitor their progress.

5. Resource Implications

Over the past 20 years, the program has been operating on the same budget. Consumable prices have increased by about 50% over the last twenty years. When verifying numbers with the Advisory Council, the program was told that the AY 18-19 year's increases were about 14%, and that the AY 19-20 would be about 5% higher still. It is anticipated that unless there are significant donations, the program will run out of consumables. As of today, this has not happened due to a stock-pile from past donations that has been

steadily dwindling over the past 12 years. The program anticipated going into the “red” for the AY 18-19 budget, but the program was fortunate to receive a \$5,000 private donation that greatly assisted the success of maintaining needed supplies and consumables in AY 18-19. However, we anticipate this same “red” deficit will happen in AY 19-20 as well.

In order to maintain safety, the program anticipates the need for an updated ventilation system. The current system is about 30 years old. The following is cut and pasted from the AY 18-19 Annual Program Review:

Describe the needed item(s) in detail.	1. Updated ventilation system
Include estimated cost(s) and timeline(s) for procurement.	<p>1. \$125,000</p> <p>The program is currently operating with a ventilation system that is at about half of its operating capacity. The ventilation system is from the 1990s and has to be closely monitored.</p>
<p>Explain how the item(s) aligns with one or more of the strategic initiatives of <u>2015-2021 Strategic Directions</u>:</p> <p>http://hawaii.hawaii.edu/sites/default/files/docs/strategic-plan/hawcc-strategic-directions-2015-2021.pdf</p>	<p>1. The outdated ventilation system is not currently an emergency situation, but it could become one if we do not address this issue. The ventilation system is also a crucial part of our program and without it we would not be able to operate the stick welding side of our curriculum.</p> <p>21CFActionStrategy1:Adopt model policies And practices for development and Management of UH buildings and campuses. Tactics</p> <ul style="list-style-type: none"> •Support and work with UH System to advocate for Hawai'i CC and Hawai'i CC – Pāalamanui facility needs. • Seek external opportunities and grants that will provide new construction and renovation funding, i.e., Title III Renovation Grants.

2019 Hawai'i Community College ARPD
Program: <<Program Name>>