



Sustainability Plan

**Advanced Manufacturing by Innovation and Design (AMID)
TC-25184-13-60-A-33
Nashua Community College
505 Amherst Street
Nashua, NH 03063**

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Sustainability Plan

- **Introduction**
- **Operations**
- **Industry Partners Continued Contributions**
- **Recommendations**
- **AMID Matrix**
- **Appendices**

This project was funded completely by a grant awarded under the Trade Adjustment Assistance to Community College and Career Training Grants, as implemented by the U.S. Department of Labor's Employment and Training Administration. Nashua Community College is an equal opportunity employer/program and auxiliary aids and services are available upon request to individuals with disabilities.

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Sustainability Plan

Introduction

The Precision Manufacturing and Mechanical Design Technology groups were an excellent choice to continue the TAACCCT grant tradition at Nashua Community College (NCC). TAACCCT3 has added to the work of TAACCCT1 and expanded the programs to utilize updated curricula, helped modernize the facilities, introduced a new stackable certificate, and technology enhance the learning programs. We have used the Core elements as outlined in our Statement of Work (see AMID Sustainability Matrix) to formulate our programs latest innovations.

The Innovations included, outreach within the community and to Industry partners, all around media outreach, support for our students, technology enhancement of all our current programs and adding a new one-year stackable certificate to our program. These aspects of the Advanced Manufacturing program at Nashua Community College are embedded in the organization as process/personnel related activities and to date have been expanded and enhanced by TAACCCT 3 funds. As the grant comes to its end we need to address the most fundamental aspect of maintaining the quality of the improved program sustainability – cost. In almost any programmatic budget, the personnel costs comprise the single largest outlay to sustain a program. Without adequate staffing, process-related programmatic activities cannot take place. Ongoing activities need people to execute them. Without adequate staffing, a program will decline – typically, once grant funds are exhausted.

Operations

As the grant nears its completion, some parts of the sustainability have already taken place.

Our two full-time instructors have been re-absorbed into the operating budget. The three Laboratory assistants' positions, which enable the ratio of students/instructor in the labs to remain at a ratio of 1:10, have also been absorbed into the operating budget. These personnel accomplish a myriad of tasks, which allow our instructors to maintain a quality program for a much larger population than would be otherwise possible. The attachment at the end of this document lists lab assistant duties. Our program's support for students are the Student Success Navigators. They allow the instructors to work on modernizing and technology enhancing course materials during this grant, while taking over much needed specific advising, soft skills training and helping students stay on track.

Retention for Technical Programs 2011-2016 AS –Degrees Percent Retained

Program	2011-12	2012-13	2013-14	2014-15	2015-16	Overall
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Automotive Technology	51.4	66.7	61.3	59.7	69.2	60.9
Aviation Technology	77.8	71.9	65.6	72.	65.2	70.5
Electronic Eng. Tech	53.3	51.2	91.2	71.2	57.7	64.6
Precision Manufacturing	69.0	82.2	80.9	79.2	87.9	81.8
Mechanical Design Technology	66.7	63.6	80.0	66.7	78.1	71.3

The College has retained one Student Success Navigator through funding from the Perkins Grant; however, the Navigator services all the technical programs. In addition, there is also a new Retention Specialist position located in the advising, funded by operations. This position offers many of the same services as the Student Success Navigator.

Industry Partners Continued Contributions

This project has strong ties to Industry partners. We continue to solicit input for the skills needed for our program to keep producing sought after trained technicians. We have also made inroads into transferring/articulating our unique program to several four - year baccalaureate programs; this opens multiple pathways for our students.

Research shows that Precision Manufacturing in this area is growing and will continue to grow for the next ten years. Our initial plan to keep the program moving forward and growing is based on specific statistics, shown below.

New Hampshire Manufacturing Facts (*Sources: U.S. Bureau of Economic Analysis and the U.S. Census Bureau*)

Manufacturers in New Hampshire account for 11.00 percent of the total output in the state, employing 9.9 percent of the workforce. Total output from manufacturing was \$7.99 billion in 2015. In addition, there were 66,300 manufacturing employees in New Hampshire in 2016, with an average annual compensation of \$77,492 in 2015.

New Hampshire Long-term Industry Projections, 2014 to 2024

		2014 est.	2024 projected	2014-2024 change	Percent Change	Average Annual Growth
332	Fabricated Metal Product Manufacturing	11,733	12748	1015	8.7%	.83%

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Source: nam.org/statedata

Our Industry Partners continue to employ our graduates or as interns while they finish their Certificates/Degrees. They have also made known that the students ability to embrace/utilize technology is an ever growing need in the field. Attached, see results of Industry Partner Survey given December 2, 2016.

Two of our Industry Partners have pledged scholarships for our students. The Rapid Manufacturing Group Scholarship is intended to assist students in achieving competency in the metalworking industry. Five \$2,000 scholarships will be awarded to full time sophomore students. The scholarship is awarded based on faculty recommendation, GPA, and Student essay. In addition, the Gene HAAS Foundation has pledged five - \$1000 scholarships for returning students and five - \$1000 scholarships for incoming freshmen; these are also based on a student essay and current GPA.

We have initiated NIMS (National Institute of Metalworking Standards) credentialing to attract additional national industry partners and qualify us for ongoing grants.

In order to keep the innovations the TAACCCT grant, introduced we must first secure the ability and buy-in of all the stakeholders to continue to move forward. Based on the statistics we will continue to have positive enrollments to meet the need for skilled workers in this area.

Recommendations

The new retention specialist is currently part of Advising. It is our recommendation to expand this role of Success Navigator to two positions in the next fiscal year. The Success Navigator goes to the various programs, advertises his /her services to the students, and encourages them to come for help. The return on investment in additional credit hours through retention for this expenditure for personnel is cost effective.

The Project Manager in addition to executing the Statement of Work and collecting data for the grant worked with the staff to put together outreach, advertising and special events. The role of the Project Manager could be expanded for all technical programs in order to technology enhance curricula, add outreach, plan special events, look into diverse industry funding of scholarships, work on additional grants and provide support.

As our technical programs grow, the cost to keep certain aspects of the curricula and hands on training up to date along with the technological advances in each area grows exponentially. Working towards partnerships with grants and sponsoring industries, would help modernize many of the curriculums and updating equipment.

The budget needed to support these personnel:

Position	Salary per year	Benefits per year	Status in current Fiscal Year
Success Navigator 2	\$37,000	\$15,000	Proposed
Project Coordinator	\$50,000	\$20,000	Proposed
Totals	\$87,000	\$35,000	

In the case of a program focused on Advanced Manufacturing, consideration should be given to the continuous need to upgrade and maintain manufacturing equipment. Therefore, the program should have an associated maintenance budget going forward.

Maintenance for these machines as specified in the following table is necessary for the current machines. The lab assistants do all routine maintenance (daily, weekly and end of semester) as specified in the Maintenance records (appendices).

Preventative maintenance estimates for Machines Precision Manufacturing Lab (based on quotes from manufacturers):

Southwest Industries	HFO Trident	10 Haas Machines	\$2195 per machine	\$21950.	Based on Dealer Estimate
Totals			\$27470.	Yearly	

The TAACCT/AMID Program budget never took over the operating budget of the Precision Manufacturing Program but added software that is used for curriculum enhancements that will need to be incorporated into the operating budget.

Software	Name	Price	Quantity	Total
Yearly	Snagit Licenses	20.97	10	\$209.70
Yearly	Tooling U Subscriptions	150.	50	7500.
Totals				\$7709.00

In addition, a capitol fund needs to be put together and a plan devised for acquiring new equipment on a fixed schedule so that the program doesn't become out of date. Continuing the pursuit NIMS accreditation/credentialing will help gather national industries notice and interest. Further investigation into corporate sponsors is worth pursuing.

The next few tables show what the TAACCCT grant accomplished and what will be sustained and by whom.

**AMID Precision Manufacturing by Innovation and Design
Nashua Community College**

Area of Focus	TAACCT Core Elements	NCC Scope of Work (document dated 11/2013) and other accomplishments	What are your plans to sustain this? If not, why?	Who will sustain it?	Why will you sustain it? What supporting evidence can you provide? (Data)	Timeline
Career Pathways (Content)	1,2,3,4	Deliverable 1.1 Precision Manufacturing Associate Degree Curriculum	Re-vamped Prec Manufacturing Curriculum, changing outcomes to competencies using Master course Template	Department head Support - with instructors and lab assistants	Industry Partner input - survey results - see attached	Ongoing
		Creating Work-based learning elements GE Internship, Amphenol, many part-time positions exist with our Industry Partners to give our students experience	It gives students the ability to get more hands on training in this field.	Department head Support - with instructors	Yes - the more hands-on experience is helpful to students	Ongoing
		# 1 Strategy: Develop stackable credentials that build Advanced Manufacturing competencies in Precision Manufacturing leading to an Associate Degree and that provides a pathway to a 4-year STEM based BS degree	Metrology and Quality Control Certificate developed for one-year certificate can stack towards associate degree. This is a great model towards shorter certificates. The social service agencies support shorter cycles financially.	Department head Support - with instructors and lab assistants	Department head Support - with instructors and lab assistants	Ongoing
		# 2 Strategy: Establish articulation agreement for up to 90 hours of transferred credits to four year Stem based Program of Study at Southern NH University	SNHU articulation in place would like to enhance choices for graduates.	Department head Support - with instructors and	It will expand Pathways for Students.	Ongoing
Curriculum and Instruction (Delivery)	1,2,3,4	Deliverable 2.1 - Updated course catalog PM AS degree	As courses are changed and enhanced, their descriptions and competencies/outcomes are updated.	Registrar marketing		Ongoing
		Deliverable 2.2 - Complete guide on how to submit course credits for transfer approval	This is a how to guide and will have to be revisited if process and procedures are changed.	CTE Advisor and Advisors	It is a help to students	Ongoing
		# 4 Strategy: Increase accessibility to technology enabled virtual learning Strategies adaptable to AM	To continue the work that has been accomplished and keep courses updated this will be an ongoing process. Using go-Pro cameras within machines projected to monitors allows more students to see details.	Department head Support - with instructors and lab assistants	Industry Partner input - survey results - see attached	Ongoing
		Instructional Designs - Videos for repetitive tasks in PM	To continue the work that has been accomplished and keep courses updated this will be an ongoing process. Many have been delivered, more are needed.	Department head Support - with instructors and Media Specialist	Some tasks need to be re-enforced and videos that students can watch help with this review.	Ongoing
		Instructional Designs - Online and hybrid classes	Transforming courses to online/hybrid/technology enhanced helps our students prepare for Industry or further education	Department head Support - with instructors and lab assistants	Industry Partner input - survey results - see attached	Ongoing
		Instructional Designs - Second Cohort in Spring	There is now a second co-hort of first semester freshmen who start in January, then the second semester sequence is offered during the summer. Letting these students complete the degree in 1.5 calendar years.	Instructors with support of Administration - depending on demand	It gives students more- different options and more flexibility. The data is that with the first class using this, we graduated the largest class ever.	Ongoing
		Deliverable 4. 1 - Virtual instruction software, including interactive simulation, incorporated into AM program of Study	The use of Tooling U will continue with operating Budget help, as new software comes along it will also be incorporated into the curriculum.	Instructors with support of Administration	Industry Partner input - survey results - see attached	Ongoing - operating budget
		Deliverable 4.2 e-portfolio available	The use of Main Street Credits and e-portfolio needs to be emphasized at the school level and offered in an ongoing fashion.	Instructors with support of Administration		

**AMID Precision Manufacturing by Innovation and Design
Nashua Community College**

Student recruitment, Comprehensive Supports & Employment (Entry & Success)	1,2,3,4	Deliverable 2.4 -Student tracking report: certificate completers, AS completers and AMID students admitted to SNHU with Transferred AM credits	We will track AMID students through the life of the grant. Follow-up for all alumni is a larger project and needs to be	Institutional Research Office		
		Success Navigators	Have one position sustained, would like to expand.	Administration	This function needs to be sustained because of the high rate of retention for our program. See attached.	
		Increase Running Start High Schools that have programs and qualify	If students receive credits from their high schools, they are more likely to pick the school that's granted them	Instructors with support		Ongoing
		Run Counselor Boot camps/programs to change minds for high School counselors	This is a program designed to show the whole field of Precision Manufacturing in a positive light.	Administration-Support with Instructors and industry	Participants Feedback	Yearly
		Deliverable 2.3 - Promotional materials and web site that disseminates AS program to students	The promotional materials put together for the grant will continue to be used. The social Media presence needs to be taken over by marketing.	Marketing - Admissions	This will help with enrollment	
Strategic alignment	1,2,3,4	Deliverable # 3.1: Provide experiential learning opportunities for dislocated and incumbent workers through State of the are facilities Lab Expansion	The Lab expansion will be kept up to date. We need to institute an ongoing capitol expense budget to renew equipment every 3-4 years. We also need an ongoing maintenance budget. See Proposals.	Administration - Business Office - with input from Instructors	Service records and maintenance proposals	Ongoing
Alignment with Previously-Funded TAACCCT Projects	1,5,6	# 3 Strategy: Provide experiential learning opportunities for new, dislocated and incumbent workers through state of the art facilities	The grants allowed the department to gain up-to-date equipment, and software. TAACCCT3 carried on the modernizing of equipment from TAACCCT1 and expanded on Curriculum updating. This needs to be maintained	Administration - Business Office - with input from Instructors	State data on the need for up to date curriculum and equipment from research.	Ongoing

TAACCCT Core Elements	Core Element Definitions	AMID Activities and Deliverables
Core Element 1: Evidence-Based Design	TAACCCT funds the development of new strategies or the replication of existing evidence-based strategies and awards grants to eligible institutions that are committed to using data for continuous improvement of programs that provide workers with the education and skills to succeed in high-wage, high-skill occupations. The Department is committed to funding programs that are likely to improve education and employment outcomes for program participants. Grantees must share information about the effectiveness of new approaches to instruction with key stakeholders.	<ul style="list-style-type: none"> •Prior Learning Assessment •Career Pathways •Work-based Learning/Training - internships •Technology Navigators •Tracking Completers-data analysis
Core Element 2: Stacked and Latticed C	The Department is interested in providing more opportunities for TAA-eligible workers and other adults to earn a variety of post-secondary credentials that have labor market value. To that end, applicants must incorporate a variety of credentials, including certificates, certifications, diplomas, and degrees, into the proposed program design. Some of these credentials should be competency-based and attest to the mastery of specific skills and knowledge learned by students, and valued by employers. For certifications, applicants should actively engage employers and/or industry associations to identify any certifications that are either necessary for employment in the field of study or are widely used by employers for hiring and promotion purposes.	<ul style="list-style-type: none"> •Organize curriculum (as possible) into stackable and/or latticeable industry credentials - Metrology and coming soon Operator's Certificate •Standardize online learning tools •Develop and/or enhance credit for prior learning processes and tools •Develop/modify instructional approach to include nationally recognized NIMS credentials •Develop/modify processes to identify, recruit, and enroll students
Core Element 3: Transferability and Articulation of Credit	The Department is interested in the transferability and articulation of academic credit that will create career pathways for TAA-eligible workers and other adults to further their education. TAACCCT programs may accomplish this through increased cooperation among institutions within and across state lines, as well as through linkages with programs, such as postsecondary career and technical education, pre-apprenticeship and apprenticeship programs, and other programs that lead to credit-bearing coursework and employment. Applicants must plan to work with other two-year colleges and four-year institutions in their state to confirm transferability and develop articulation agreements for TAACCCT-funded courses and credentials, including building bridges from non-credit courses and programs to credit-bearing courses and programs within and between institutions.	<ul style="list-style-type: none"> •Coordinate annual Manufacturing week career expos - HAAS Open House •PLA •Articulation with SNHU
Core Element 4: Advanced Online and Technology-Enabled Learning	Applicants must incorporate online and/or technology-enabled learning strategies into their program design. Online and technology-enabled (including hybrid, or a blend of online and classroom instruction) learning strategies provide adults an opportunity to balance the competing demands of work and family with acquiring new knowledge and skills at a time, place, and/or pace that are convenient for them. Applicants should consider using technology to enable rolling and open enrollment processes, modularize content delivery, simulate assessments and training, and accelerate course delivery strategies.	<ul style="list-style-type: none"> •Develop more uses for Tooling U •More videos to enhance and standardize instruction - Expanded use of HAAS simulators to enlarge ability to handle more students at the same time. •Flexible Scheduling to allow 2nd Cohort inSpring •PLA
Core Element 5: Strategic Alignment	Applicants must demonstrate that they performed outreach to, and gathered information on, relevant entities in the communities to be served by the project, including entities that can provide data on the characteristics and skill needs of workers receiving TAA benefits and services in the community. For purposes of the TAACCCT program, a "community" is a city, county, or other political subdivision of a State or a group of political subdivisions of a State. Applicants must align their programs with at least four types of key stakeholders in each of the communities represented: (i) Governors; (ii) employers and industry; (iii) the public workforce system; and (iv) philanthropic organizations, business-related and other non-profit organizations, community-based organizations, and labor organizations.	<ul style="list-style-type: none"> •Enhance services for TAA eligible, Veteran, and other adult learners with local workforce agencies through Success Navigators •Host regular social Service Roundtables •Establish a framework for aligning regional/state initiatives •Industry Partner Events
Core Element 6: Alignment with Previously-Funded TAACCCT Projects	All applicants must research educational institutions that received funding through TAACCCT Round 1 to help decrease duplication and to strengthen the geographic reach of their projects, and should coordinate efforts where possible. Applicants must consider connecting with TAACCCT grantees that are developing and delivering content within the same targeted occupation or industry, or that have designed a technology infrastructure which enhances the teaching and learning experience. This connection could include sharing information, lessons learned, and program content; sharing technological innovations; developing transferability and articulation agreements; and working together to standardize credentials.	<ul style="list-style-type: none"> •Main Street Credits: Credit for Prior Learning - Shared process of tracking students from TAACCCT1 •Visiting Quigsgimond Community College in Worcester Ma, early in our process

Lab Assistants combined list of duties

Student supports

- Teach students how to be safe around the machine.
- Show students where all the tooling is and where to put it when their done using it.
- Teach them how to clean up after their done for the day.
- Teach the student how to find prints and document on NCCs computer system.
- Teach them all the parts of the lathes and mills what they do.
- On the mills, teach what direction a cutter should turn and how to secure a part in a vise. On the lathe teach them what direction the part should turn and how to hole a part in a collet or a chuck.
- What feeds and speeds they should use.
- Teach what tools should be used for the projects their working on.
- Teach what they should be doing first – sequencing.
- On the mills, teach the student how to find an edge part to be able to set zeros on X axis and Y-axis.
- Teach them simple math adding, subtracting, multiplying and division. - A LOT OF HELP
- Help the student with decimals and fractions. A LOT OF HELP
- We work with them on manually moving the X, Y, and Z to manufacture their projects.
- Set up various lab training sessions.

- Manual Machining
 1. Instruct and demonstrate proper machining techniques to students.
 2. Recommend changes to student machining techniques to:
 - a) Improve part finish
 - b) Increase productivity
 - c) Improve work holding
 - d) Establish logical order of machining operations
 3. Assist students in interpretation of part drawings.
 4. Demonstrate fixture usage to students.
 5. Inspect and measure student parts.
- Help with assembly of projects
- Teach the students about quality control. How to inspect and record the dimensions of their parts.
- Mock interviews
- Help with offsite Machine shop tours.
- Helps students get jobs.

- Listen to student's problems, and give life advice.

3D printing

1. Assist students and staff with programming and use of 3D printers.
2. Facilitate removal of support material on student's 3D printed parts.
3. 3D printer preventative maintenance and housekeeping.
4. Renewal of support material dissolvent.

- CNC Machining

1. Assist students with proper setup of tooling in CNC machine tools.
2. Assist students with proper setup of work pieces in CNC machine tools.
3. Assist students with the programming of CNC machine tools
 - a) Advising students on manufacturing software usage
 - b) Helping students optimize tool usage
 - c) Reviewing student's CNC programs to ensure safety and productivity
 - d) Assisting and advising students with hand-written CNC programming
4. Monitor student activity and machine usage in CNC lab.
5. Assist students in locating necessary tooling.
6. Recommend tooling and procedural updates to Precision Manufacturing staff.

Instructor Supports

- Grade MTTN- 111, MTTN-122, and MTTN-231 lab projects.
- Inventory bar stock to make sure we have the right material for student's project.
- Cut material for students' projects.

Lab Supports

- Inventory tooling and fasteners.
 - Receive deliveries make sure the paper work is done.
 - Organize the shop, cleaning the machine, sweep the floors even mop the floors, empty trash.
 - Do maintenance on equipment, empty the control panels of old programs
 - Reset toolboxes and storage between semesters.
 - Ensure sufficient metal stock is prepared for student use.
 - Ensure that consumables are stocked and ready for use.
 - Organize items in storage cabinets for ease of use.
 - Sharpen drills on SPG drill grinder.
- Lab Computers

1. Assist IT Department with software updates
2. Advise IT department regarding computer layout on lab computers

Lab Maintenance

- Refill daily cutting oilcans and WD-40 bottles.
- Refill machine lube reservoirs.
- Manual Machines
 1. General preventative maintenance on ProtoTrak and Sharp milling machines, Clausing and ProtoTrak lathes.
 2. Tramming manual mills
 3. Light repair of damaged/malfunctioning manual machinery
 - a) Replacement of ProtoTrak mill drawbars
 - b) Repair of ProtoTrak lathe collet closers
 - c) Replacement of Clausing lathe feed shear pins
 4. Other maintenance and repair as required
- Computer-Numeric-Control (CNC) Machines
 1. Preventative maintenance on Haas CNC milling machines and lathes
 - a) Coolant maintenance and renewal
 - b) Lubricant replenishment as necessary
 2. Light repair of CNC machines
 - a) Lathe and milling machine automatic tool probe recalibration

Industry Partners Survey Results 12/2/2016

	A	B	C	D	E	F	G	H	I	J
	Questions	Industry Partner 1	Industry Partner 2	Industry Partner 3	Industry Partner 4	Industry Partner 5	Industry Partner 6	Industry Partner 7	Industry Partner 8	Industry Partner 9
5										
6	What additional/new skill(s) would you like our graduates to have upon completion of the program?	Analytical skill to eliminate potential effects during Machining and set up driving to root cause of a problem	Some knowledge of lasers as it relates to material cutting and joining	Basic understanding of Statistical run Charts	Quality, Business Ethics and Communication	Attention to detail, problem solving, work ethic	Lean Manufacturing 3+2 or 5 axis training, robot interfacing		Wire EDM	
7	What new trends in manufacturing do you see affecting your business	Increased demand with no ability to service the demand	Laser-marking	Robotic automation tied into statistical run charts	Technology	People not interested in back shifts	Automation, 5 axis machining, machining small batches, many	Ability to produce Full added value Capabilities	Rapid Prototyping	3-d printing
8			Mirror Water-jet cutting							
9	What skill(s) should our students be getting more experience with?	Drawing Interpretation, analytical skills, root cause analysis			Quality, Business Ethics	Measuring, Machines, Speeds/feeds, Problem Solving	Open minded to new and constantly changing technology		Learning to function away from cell phones	CAM Programming
10	When you hire one of our students their initial job function is:	CNC Machine Operation	Manual Machining, deburring,	Through our internship graduates have	Quality or Operator	Operator/Set-up person working into	Service Tech	Evaluation Phase i.e. "Operator	Machining and Assembly of Tools and Dies	Machine Operator
11	If you hire our students how do you	Direct	Direct	Internship to hire	Direct	Direct apply online	Direct	Direct	So far, we have only hired Interns	Direct, Referrals from Faculty, Open House
12				Direct applicants from job postings						
13	If you're interested in hiring our students would you consider giving a talk to one of our classes or offering a tour?	Yes	Yes	Currently working with Mr. Dodge and Howe on meeting with all perspective candidates, one on one.	Yes	Yes	Yes	Yes	Yes	Yes
14	Is there a new program you would like to see us offer?	Effects of poor quality on profit	Not at this time.	CMM Programming and Unigraphics	More Blueprint reading	Not at this time	Automation, Robots			MFG Processing

Manual and Proto Trak Room

<u>Label</u>	<u>Make</u>	<u>Model</u>	<u>Serial Number</u>	<u>Type</u>	<u>Inventory Tag (Foil)</u>	<u>Inventory Tag (Bar Code)</u>	<u>Manufacture Date</u>	<u>Daily if used</u>	<u>As Needed</u>	<u>The End of Each Semester</u>	<u>yearly</u>	<u>Comments</u>	<u>Vendor</u>
KM 1	ProtoTrak	Trak K3 EMX	123DB448100	Knee Mill	none	173270	1-Jun-2012	oiled, cleaned, and whipped down machine ,that have been used	Calibrate and adjust readouts, indicate vise and head as need replace draw bars	topped off oil (Vactra #2) levels, Grease, Clear the Memory			http://www.southwesternindustries.com
KM 2	ProtoTrak	Trak K3 EMX	123DB448103	Knee Mill	none	173274	1-Jun-2012	oiled, cleaned, and whipped down machine ,that have been used	Calibrate and adjust readouts, indicate vise and head as need replace draw bars	topped off oil (Vactra #2) levels, Grease, Clear the Memory			http://www.southwesternindustries.com
KM 3	ProtoTrak	Trak K3 EMX	123DB448101	Knee Mill	none	173271	1-Jun-2012	oiled, cleaned, and whipped down machine ,that have been used	Calibrate and adjust readouts, indicate vise and head as need replace draw bars	topped off oil (Vactra #2) levels, Grease, Clear the Memory		02Oct14 Z-Axis DRO is not working properly. Needs repair, vendor service pending.	http://www.southwesternindustries.com

KM 4	ProtoTrak	Trak K3 EMX	123DB448 099	Knee Mill	none	173273	1-Jun-2012	oiled, cleaned, and whipped down machine ,that have been used	Calibrate and adjust readouts, indicate vise and head as need replace draw bars	topped off oil (Vactra #2) levels, Grease, Clear the Memory		<p>service code 97 needed: 4.4.4 X, Y, and Z-Axis DRO Counting in Wrong Direction</p> <p>The DRO is counting in the wrong direction. The positive directions for each axis are: • X-axis – Table moves to the left. • Y-axis – Saddle moves toward the front of the machine. • Z- axis – Quill moves up. Do the following service code and procedures: • Code 33</p>	<p>http://www.southwesternindustries.com</p>
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KM 5	ProtoTrak	Trak K3 EMX	123DB448 102	Knee Mill	none	173272	1-Jun-2012	oiled, cleaned, and whipped down machine ,that have been used	Calibrate and adjust readouts, indicate vise and head as need replace draw bars	topped off oil (Vactra #2) levels, Grease, Clear the Memory		04Sep14 Faulty drawbar air tool, tightened cap screws on top of unit, reduced air line pressure to 100 PSI. Tested OK. Jeff	http://www.southwesternindustries.com
SMX- PROTO 6	ProtoTrak	Trak K3	98-0238	Knee Mill	none	173027	1-Jan-1970	oiled, cleaned, and whipped down machine ,that have been used	Calibrate and adjust readouts, indicate vise and head as need replace draw bars	topped off oil (Vactra #2) levels, Grease, Clear the Memory			http://www.southwesternindustries.com
MDCNKM 1	Sharp	OMV	none	Knee Mill	none	173037	1-Oct-2001	oiled, cleaned, and whipped down machine ,that have been used	Calibrate and adjust readouts, indicate vise and head as need replace draw bars	topped off oil (Vactra #2) levels, Grease, Clear the Memory		Acu- right controller add 2016 Meehanite	

SHKM 1	Sharp	OMV	00404442	Knee Mill	none	173029	1-Oct-2001	oiled, cleaned, and whipped down machine ,that have been used	Calibrate and adjust readouts, indicate vise and head as need replace draw bars	topped off oil (Vactra #2) levels, Grease, Clear the Memory		Proto trak controller add 2016 Meehanite	
SHKM 2	Sharp	OMV	00404440	Knee Mill	none	173031	1-Oct-2001	oiled, cleaned, and whipped down machine ,that have been used	Calibrate and adjust readouts, indicate vise and head as need replace draw bars	topped off oil (Vactra #2) levels, Grease, Clear the Memory		Proto trak controller add 2016 Meehanite	
SHKM 3	Sharp	OMV	0040441	Knee Mill	none	173030	1-Oct-2001	oiled, cleaned, and whipped down machine ,that have been used	Calibrate and adjust readouts, indicate vise and head as need replace draw bars	topped off oil (Vactra #2) levels, Grease, Clear the Memory		Meehanite	

CLA 5	Colchester	Student 2500	306687	Lathe	none	173022	1-Jan-2001	oiled, cleaned and whipped down machine that have been used	Adjust Gibbs on cross slide and compound. Replace bolt on compound.	topped off oil (Vactra #2) levels, prior levels full			600 Lathes Heckmondwike
Proto 1	ProtoTrak	Trak TRL 1630SX	123CH448 116	Lathe	none	173275	1-Jul-2012	oiled, cleaned, and whipped down machine ,that have been used		topped off oil (Vactra #2) levels, prior levels full 3, Clear the Memory			http://www.southwesternindustries.com
Proto 2	ProtoTrak	Trak TRL 1630SX	123CH448 119	Lathe	none	173277	1-Jul-2012	oiled, cleaned, and whipped down machine ,that have been used		topped off oil (Vactra #2) levels, prior levels full 3, Clear the Memory			http://www.southwesternindustries.com
Proto 3	ProtoTrak	Trak TRL 1630SX	123CH448 117	Lathe	none	173276	1-Jul-2012	oiled, cleaned, and whipped down machine ,that have been used	indicate vise and head as need	topped off oil (Vactra #2) levels, prior levels full 3, Clear the Memory		02Oct14 LED light for "S" S/F button on pendant. Needs repair, vendor service pending.	http://www.southwesternindustries.com

Proto 4	ProtoTrak	Trak TRL 1630SX	161CH560	Lathe	none	173450		oiled, cleaned, and whipped down machine ,that have been used		topped off oil (Vactra #2) levels, prior levels full 3, Clear the Memory			http://www.southwesternindustries.com
Proto 5	ProtoTrak	Trak TRL 1630SX	123CH448 114	Lathe	none	173269	1-Jul-2012	oiled, cleaned, and whipped down machine ,that have been used		topped off oil (Vactra #2) levels, prior levels full 3, Clear the Memory			http://www.southwesternindustries.com
Proto 6	ProtoTrak	Trak TRL 1630SX	123CH448 112	Lathe	none	173268	1-Jul-2012	oiled, cleaned, and whipped down machine ,that have been used	indicate vise and head as need	topped off oil (Vactra #2) levels, prior levels full 3, Clear the Memory			http://www.southwesternindustries.com
PED GRINDER	SETCO	102-134	78367	Pedestal Stand Grinder				oiled, cleaned and whipped down machine that have been used	adjust hand guard,		017737	000544	1-Jan-1970

BELT / SANDER 1	Jet belt sander / disc grinder	JSG_60C	16124057	belt sander / disc grinder				oiled, cleaned and whipped down machine that have been used	Change belts and disc					
HOR SAW 1	Kalamazoo	H9AW	K22061	Horizontal Band Saw	none	173044	1-Jan-1970	oiled and cleaned and whipped down machine that have been used						
VERT SAW 1	Powermatic	89	089124	Vertical Band Saw	none	000531	1-Jan-1970	oiled, cleaned and whipped down machine that have been used						
EDM 1	Genspark America	ZNCGY26	000382	EDM	none	173028	1-Dec-2000	oiled, cleaned and whipped down machine that have been used						
SCREW MACH 1	Citizen	L12-1M7	F50981	Swiss screw machine		173473		oiled, cleaned and whipped down machine that have been used						
BAR FEED 1	Edge Minuteman			Bar Feeder		173475								

CNC ROOM

<u>Label</u>	<u>Make</u>	<u>Model</u>	<u>Serial Number</u>	<u>Type</u>	<u>Inventory Tag (Foil)</u>	<u>Inventory Tag (Barcode)</u>	<u>Manufacture Date</u>	<u>Daily if used</u>	<u>As Needed</u>	<u>The End of Each Semester</u>	<u>yearly</u>	<u>Comments</u>	<u>Vendor</u>
Haas 1	HAAS	SL20T	65067	Lathe	none	173049	1-May-2002	check coolant level, oiled, cleaned, and whipped down machine ,that have been used	Change batteries	Clean Machine remove tooling	Pumped out coolant tank. Refilled coolant 30 gallons 5% mix.	Coolant capacity 40 gallons	http://www.haascnc.com
Haas 2	HAAS	ST10	3092740	Lathe	none	173267	1-Jul-2012	check coolant level, oiled, cleaned, and whipped down machine ,that have been used	Change batteries	Clean Machine remove tooling	Pumped out coolant tank. Refilled coolant 30 gallons 5% mix.	Coolant capacity 30 gallons	http://www.haascnc.com

Haas 3	HAAS	ST10	3092763	Lathe	none	173266	1-Jul-2012	check coolant level, oiled, cleaned, and whipped down machine ,that have been used	Change batteries	Clean Machine remove tooling	Pumped out coolant tank. Refilled coolant 30 gallons 5% mix.	Coolant capacity 30 gallons	http://www.hascnc.com
Haas 4	HAAS	ST10	3092762	Lathe	none	173265	1-Jul-2012	check coolant level, oiled, cleaned, and whipped down machine ,that have been used	Change batteries	Clean Machine remove tooling	Pumped out coolant tank. Refilled coolant 30 gallons 5% mix.	Coolant capacity 30 gallons	http://www.hascnc.com
Haas 6	HAAS	Mini Mill2	1133404	Mini Mill2		173476	1-Jan-2017		Change batteries				
Haas 7	HAAS	VF 1D	27582	Mill	none	173050	1-Jan-2002	check coolant level, oiled, cleaned, and whipped down machine ,that have been used	Change batteries	Remove vise clean table, Remove tooling	Pumped out coolant tank. Refilled coolant 30 gallons 5% mix.	Coolant capacity 40 gallons. Change Air Filter on back?	http://www.hascnc.com

Haas 8	HAAS	Mini Mill	1128237	Mini Mill	none	173449	1-Dec-2016	check coolant level, oiled, cleaned, and whipped down machine ,that have been used	Change batteries	Remove vise clean table, Remove tooling	Pumped out coolant tank. Refilled coolant 30 gallons 5% mix.	Coolant capacity 24 gallons	http://www.haascnc.com
Haas 9	HAAS	Mini Mill	1096384	Mini Mill	none	173264	1-Jul-2012	check coolant level, oiled, cleaned, and whipped down machine ,that have been used	Change batteries	Remove vise clean table, Remove tooling	Pumped out coolant tank. Refilled coolant 30 gallons 5% mix.	Coolant capacity 24 gallons	http://www.haascnc.com
Haas 10	HAAS	Mini Mill	1096386	Mini Mill	none	173263	1-Jul-2012	check coolant level, oiled, cleaned, and whipped down machine ,that have been used	Change batteries	Remove vise clean table, Remove tooling	Pumped out coolant tank. Refilled coolant 30 gallons 5% mix.	Coolant capacity 24 gallons	http://www.haascnc.com

Haas 11	HAAS	Mini Mill	1096385	Mini Mill	none	173262	1-Jul-2012	check coolant level, oiled, cleaned, and whipped down machine ,that have been used	Change batteries	Remove vise clean table, Remove tooling	Pumped out coolant tank. Refilled coolant 30 gallons 5% mix.	Coolant capacity 24 gallons	http://www.haascnc.com
SIM 1	HAAS	CSMD	809764	HAAS CONTROL SIMULATORS			6-Jul-2012		Change batteries	Remove vise clean table, Remove tooling			
SIM 2	HAAS	CSMD	816069	HAAS CONTROL SIMULATORS			9-Dec-2015		Change batteries	Remove vise clean table, Remove tooling			
SIM 3	HAAS	CSMD	817191	HAAS CONTROL SIMULATORS			Jul-16		Change batteries	Remove vise clean table, Remove tooling			
Mo 3D PR	MoJo	MoJo3D	JO1182			173405				check supply levels			
SIM 4	HAAS	CSMD	809212	HAAS CONTROL SIMULATORS			9-Dec-2015		Change batteries				

SIM 5	HAAS	CSMD	809273	HAAS CONTR OL SIMULA TORS			9-Dec-2015		Change batteries				
SIM 6	HAAS	CSMD	809765	HAAS CONTR OL SIMULA TORS			6-Jul-2012		Change batteries				
<u>DIRTY ROOM</u>													
<u>Label</u>	<u>Make</u>	<u>Model</u>	<u>Serial Number</u>	<u>Type</u>	<u>Invento ry Tag (Foil)</u>	<u>Inventory Tag (Bar Code)</u>	<u>Manufacture Date</u>	<u>Daily if used</u>	<u>As Needed</u>	<u>The End of Each Semester</u>	<u>yearly</u>	<u>Comments</u>	<u>Vendor</u>
PED GRINDER2	SETCO	102	78534	Pedestal Stand Grinder	01736	000543	1-Jan-1970	oiled, cleaned and whipped down machine that have been used	adjust hand guard,				
SURF GRINDER1	Falcon	FSG- 2A618	B7802001	Surface Grinder	none	173051	1-Jan-1970	oiled, cleaned and whipped down machine that have been used					

SURF GRINDER2	Falcon	FSG-618M	A3855005	Surface Grinder	none	?	1-Jan-1970	oiled, cleaned and whipped down machine that have been used	adjust hand guard,				
TOOL GRINDER1	Baldor	500	966	Pedestal Stand Grinder	16-110	007822	1-Jan-1970	adjust hand guard, oiled, cleaned and whipped down machine that have been used					Berlin
TOOL GRINGER2	Baldor	500	966	Pedestal Stand Grinder	16-110	007822	1-Jan-1970	adjust hand guard, oiled, cleaned and whipped down machine that have been used					Berlin
PED GRINDER3	SETCO	102	T8653	Pedestal Stand Grinder	none	000545	1-Jan-1970	adjust hand guard, oiled, cleaned and whipped down machine that have been used	adjust hand guard,				
HEAT TREAT1	Lucifer Furnace	RD7-421	6435	Heat Treatment Furnace	none	173021	1-Jan-1970						

HEAT TREAT2	Lucifer Furnace	RD7-421	6434	Heat Treatment Furnace	none	173020	1-Jan-1970						
Rockwell Tester1	ACCO Wilson	none	none	Rockwell Hardness Tester	none	000491	1-Jan-1970						ACCO Wilson Instrument
<h1><u>Metrology</u></h1>													
<u>Label</u>	<u>Make</u>	<u>Model</u>	<u>Serial Number</u>	<u>Type</u>	<u>Inventory Tag (Foil)</u>	<u>Inventory Tag (Bar Code)</u>	<u>Manufacture Date</u>	<u>Daily if used</u>	<u>As Needed</u>	<u>The End of Each Semester</u>	<u>yearly</u>	<u>Comments</u>	<u>Vendor</u>
MET 1	Brown & Sharp	Micro Hite	8V022520 5										
CMM1	Mitutoya	CRT PM875	461504			173448						Calibrated 2-11-2016	
Met 3	Micro VU	Sol311	SL311010 85			173289							
MF 3D PR	Mark Forge	Mark Two	33256010- a030			173451				check supply levels			
UP 3D pr	Uprint se		P53786			173278				check supply levels			
OP-COM	Clausing Covel	4301	14B-3330	Optical Comparat or	none	173039	1-Jan-1970						Clausing Covel
<h1><u>Air Compressors</u></h1>													
<u>Label</u>	<u>Make</u>	<u>Model</u>	<u>Serial Number</u>	<u>Type</u>	<u>Inventory Tag (Foil)</u>	<u>Inventory Tag (Bar Code)</u>	<u>Manufacture Date</u>	<u>Daily if used</u>	<u>As Needed</u>	<u>The End of Each Semester</u>	<u>yearly</u>	<u>Comments</u>	<u>Vendor</u>

Air 1	Speedaire	4B229B	L3-00055	Portable Air Compressor	none	097797	1-Feb-2000		Maintenance				Speedaire
Air 2	Sullair	SHOP TEK ST500/ST510RD	201209210037	Air Compressor	none	none	1-Sep-2012			We have a Pm Contract and the they service			
Air 3	Sullair	RH-35-115-1-60A	19125A01216	Air Dryer									
<u>Rooms 145 & 147</u>													
<u>Label</u>	<u>Make</u>	<u>Model</u>	<u>Serial Number</u>	<u>Type</u>	<u>Inventory Tag (Foil)</u>	<u>Inventory Tag (Barcode)</u>	<u>Manufacture Date</u>	<u>Daily if used</u>	<u>As Needed</u>	<u>The End of Each Semester</u>	<u>yearly</u>	<u>Comments</u>	<u>Vendor</u>
145 JT2	INFOCUS	INFO502 WB/INF700		Large touch screen monitors					Change batteries in remote				
SIM 7	HAAS	CSMD	809771	HAAS CONTROL SIMULATORS			6-Jul-2012		Change batteries				
147 JT1	INFOCUS	INFO502 WB/INF700		Large touch screen monitors					Change batteries in remote				