

Oakland Community College

Curriculum Review Committee

**Reports Supporting the Review of the
Machine Tool Technology &
Machine Tool Numerical Control**

**Prepared by the Office of Assessment & Effectiveness
January 2009**



**OAKLAND
COMMUNITY
COLLEGE**

Major Highlights

Program Dashboard

**Program Dashboard Percent of Targets
Achieved**

Credit Hour Trends

Degree Trends

Occupational Projections

Occupational Skills Analysis

Program Assessment Plan

Program Assessment Findings

CRC Recommendations

CRC Follow-Up

Machine Tool Technology and Machine Tool Numerical Control Technology

Major Highlights

December 2008

Overview

The information contained in this binder represents supporting reports and data associated with the CRC's review of both the Machine Tool Technology and the Machine Tool Numerical Control Technology programs. These reports are intended to provide a historical perspective, as well as an idea of current strengths and future challenges facing the programs which may impact short and long term curriculum development.

Major Highlights

- Of all curriculum at OCC, the Machine Tool Technology program has the lowest overall composite dashboard score at 5.96. Moreover, the composite dashboard score for this program has steadily declined over the past three years which warrants more in-depth investigation.
- During 2007-08, 80% of all offered ATM sections were canceled, while those that were taught ran at just over 46% of capacity. Additionally, the trend in credit hour enrollment represents one of the fastest declining areas in the college. Combined, these latest figures strongly suggest a need to examine the extent to which the current curriculum offering is meeting both student and industry need.
- In large part enrollment in this program is directly impacted by the dramatic decline in the regions manufacturing industry. Although the need for skilled Machine Tool Technicians will continue, as a whole the occupation is declining in Southeast Michigan. All occupational categories associated with this field are projected to decrease by nearly 2,000 jobs over the next five years. Employment opportunities will primarily result from the need to replace current workers due to retirement, migration, etc.
- The number of new jobs in the Numerical Control Technology field are declining at a slower rate than the Machine Tool Technology field, but similarly projecting employment opportunities in replacement jobs in the next five years.
- In total, 2 Certificates were granted over the past ten years in Machine Tool Technology. Although the Associates program no longer exists, a total of 4 students received a degree in the program over the past decade. In addition, the Numerical Control program has granted 7 Certificates and 11 Associate Degrees over the past ten years.
- As of December 2008 the Machine Tool Technology program has not prepared or submitted a plan for the on-going assessment of student learning. This is in violation of requirements established by the Student Outcomes Assessment Committee (SOAC) and affirmed by the Chancellor's Cabinet. Lack of compliance to this requirement has direct negative implications for the College's accreditation status with the Higher Learning Commission (HLC) of the North Central Association (NCA).
- However, the Numerical Control Technology program has established an assessment plan with five learning outcomes and a total of nine benchmarks, which is in accordance of the SOAC requirements. Yet it is worth noting that two of these benchmarks have no assessment method indicated within the plan and none of the nine benchmarks were assessed between June 2007 and June 2008.

Oakland Community College Program Dashboard

The purpose of the program dashboard is to provide a data driven tool designed for the objective review of all curriculum offerings. Based on a common set of measures which apply to all curriculum the dashboard facilitates the systematic identification of well performing as well as ailing curriculum in order to support short and long range curriculum development.

In a rapidly changing economic and competitive environment it is necessary if not imperative to continually review curriculum offerings annually. Dashboard reports are a useful tool for monitoring program performance. In addition, they allow for an integrated approach for collecting, presenting, and monitoring data to meet long and short-term curriculum decision-making needs.

The Program Dashboard is based on seven measures which include:

- Sections Filled to Capacity
- Percent of Canceled Sections
- Credit Hour Trend Ratio
- Percent of Minority Students
- Percent of Withdrawals
- Percent of Incompletes
- Student Course Completion Rate

The following report provides summative information for the most recent academic year as well as detailed trend data on each measure over the past several years.

Student Course Completion Rate

Prefix ATM

Prefix Title Machine Tool Technology

	2007-08	2006-07	2005-06	2004-05
Successful Grades	14	38	143	70
Total Student Grades	24	55	168	89
Student Course Completion Rate	58.3%	69.1%	85.1%	78.7%

Definition:

The percent of students who successfully complete a course with a grade of "C" or higher. Calculation includes grades from the entire academic year Summer II, Fall, Winter and Summer I. Student success rates are based on end of session data after grades have been posted. The following grades/marks are excluded from the calculation: Audit (AU), Not Attended (N), Not Reported (NR), and Missing status. This is one indication of student success.

Methodology:

Percent of Incompletes

Prefix ATM

Prefix Title Machine Tool Technology

	2007-08	2006-07	2005-06	2004-05
Total Incompletes	0	0	0	0
Total Grades	24	55	168	89
Percent of Incompletes	0.0%	0.0%	0.0%	0.0%

Definition:

The percent of students who receive an incomplete in their course. Calculation includes the entire academic year Summer II, Fall, Winter and Summer I. Moreover, the calculations are based on end of session files, after grades are posted. Percent of incompletes is derived by dividing the total number of incompletes by the total number of grades and marks awarded throughout the academic year. The Continuous Progress (CP) grade is considered an Incomplete (I). Meanwhile, calculations exclude: Audit (AU), Not Attended (N) Not Reported (NR), and Missing status. This is one indication of student success.

Methodology:

Percent of Withdrawals

Prefix ATM

Prefix Title Machine Tool Technology

	2007-08	2006-07	2005-06	2004-05
Total Withdrawals	8	14	23	17
Total Grades	24	55	168	89
Percent of Withdrawals	33.3%	25.5%	13.7%	19.1%

Definition:

The percent of students who withdraw from their course after the term begins. Calculation includes the entire academic year Summer II, Fall, Winter and Summer I. Moreover, the calculations are derived from end of session data, after grades are posted. Percent of withdrawals is derived by dividing the total number of student initiated withdrawals by the total number of grades and marks awarded throughout the academic year. The Withdrawal-Passing (WP) and Withdrawal-Failing (WF) are considered Withdrawals (W). Meanwhile, calculations exclude: Audit (AU), Not Attended (N), Not Reported (NR), and Missing status. This is one indication of student success.

Methodology:

Percent of Minority Students

Prefix ATM

Prefix Title Machine Tool Technology

	2007-08	2006-07	2005-06	2004-05
Minority Students	2	5	27	12
Total Students	24	43	122	71
Percent of Minority Students	8.3%	11.6%	22.1%	16.9%

Definition:

The percent of students who are minority in relation to all enrolled students. Minority status is self-reported by the student and includes African American, Asian, Hispanic, Native American Indian and Other. Calculation is based on the full academic year Summer II, Fall, Winter and Summer I. Percentages are computed on those students enrolled as of the end of the term and exclude missing data.

Methodology:

Credit Hour Trend Ratio

Prefix ATM
Prefix Title Machine Tool Technology

	2007-08	2006-07	2005-06	2004-05
Credit Hours Year 1	281	229	181	153
Credit Hours Year 2	400	281	229	181
Credit Hours Year 3	165	400	281	229
Credit Hours Year 4	79	165	400	281
Credit Hours Period 1	282	303	230	188
Credit Hours Period 2	215	282	303	230
Credit Hours Ratio	0.76	0.93	1.32	1.23

Definition:

Trend in credit hour enrollment based on a three year rolling average. Includes total credit hours over the academic year Summer II, Fall, Winter and Summer I. The calculation is based on those students enrolled on the terms official census date (one-tenth day). In order to establish a meaningful enrollment statistic which applies to large as well as small disciplines/programs a "ratio" is calculated based on a three year rolling average of student credit hours. The formula used to calculate this measure involves three simple steps:

- a. $\text{Year 1} + \text{Year 2} + \text{Year 3} / 3 = \text{Period 1}$
- b. $\text{Year 2} + \text{Year 3} + \text{Year 4} / 3 = \text{Period 2}$
- c. $(\text{Period 2} - \text{Period 1}) / \text{Period 1} = \text{Ratio}$

If the ratio is greater than "1" this means there has been an enrollment increase. On the other hand, if the ratio is less than "1" this translates into an enrollment decline. The larger the number the larger the enrollment increase. Likewise, the lower the number the greater the enrollment decline.

Methodology:

Percent of Cancelled Sections

Prefix ATM

Prefix Title Machine Tool Technology

	2007-08	2006-07	2005-06	2004-05
Active Sections	3	7	15	11
Cancelled Sections	12	5	2	5
Total Sections	15	12	17	16
Percent of Cancelled Sections	80.0%	41.7%	11.8%	31.2%

Definition:

Of all offered credit sections the percent of sections that are canceled as of the end of the term. Calculation includes all four terms during the academic year Summer II, Fall, Winter and Summer I. The calculation is based on a simple formula which takes the number of canceled credit sections which is then divided by the total number of offered credit sections. This measure is one indicator of scheduling strategies and student demand.

Methodology:

Sections Filled to Capacity

Prefix ATM

Prefix Title Machine Tool Technology

	2007-08	2006-07	2005-06	2004-05
Total Students	24	55	168	89
Total Capacity	52	121	168	195
Sections Filled To Capacity	46.2%	45.5%	100.0%	45.6%

Definition:

Of all available seats, the percent that are filled based on end of term enrollment data. Calculation includes all four terms within the academic year Summer II, Fall, Winter and Summer I. This measure reflects the extent to which all credit "sections" are filled to their designated capacity e.g. allocated seats divided by the total number of available seats between July 1 and June 30. In particular, this measure provides one indication of the magnitude of student demand.

Methodology:

Program Dashboard Detail Report

Prefix ATM

Title Machine Tool Technology

	Program				College Wide
	2007-08	2006-07	2005-06	2004-05	2007-08
Sections Filled to Capacity	46.2%	45.5%	100.0%	45.6%	85.6%
Percent of Cancelled Sections	80.0%	41.7%	11.8%	31.2%	9.7%
Credit Hour Trend Ratio	0.76	0.93	1.32	1.23	1.02
Percent of Minority Students	8.3%	11.6%	22.1%	16.9%	28.7%
Percent of Withdrawals	33.3%	25.5%	13.7%	19.1%	18.4%
Percent of Incompletes	0.0%	0.0%	0.0%	0.0%	1.5%
Student Course Completion Rate	58.3%	69.1%	85.1%	78.7%	67.4%
Dashboard Score	5.96	7.38	10.56	8.54	

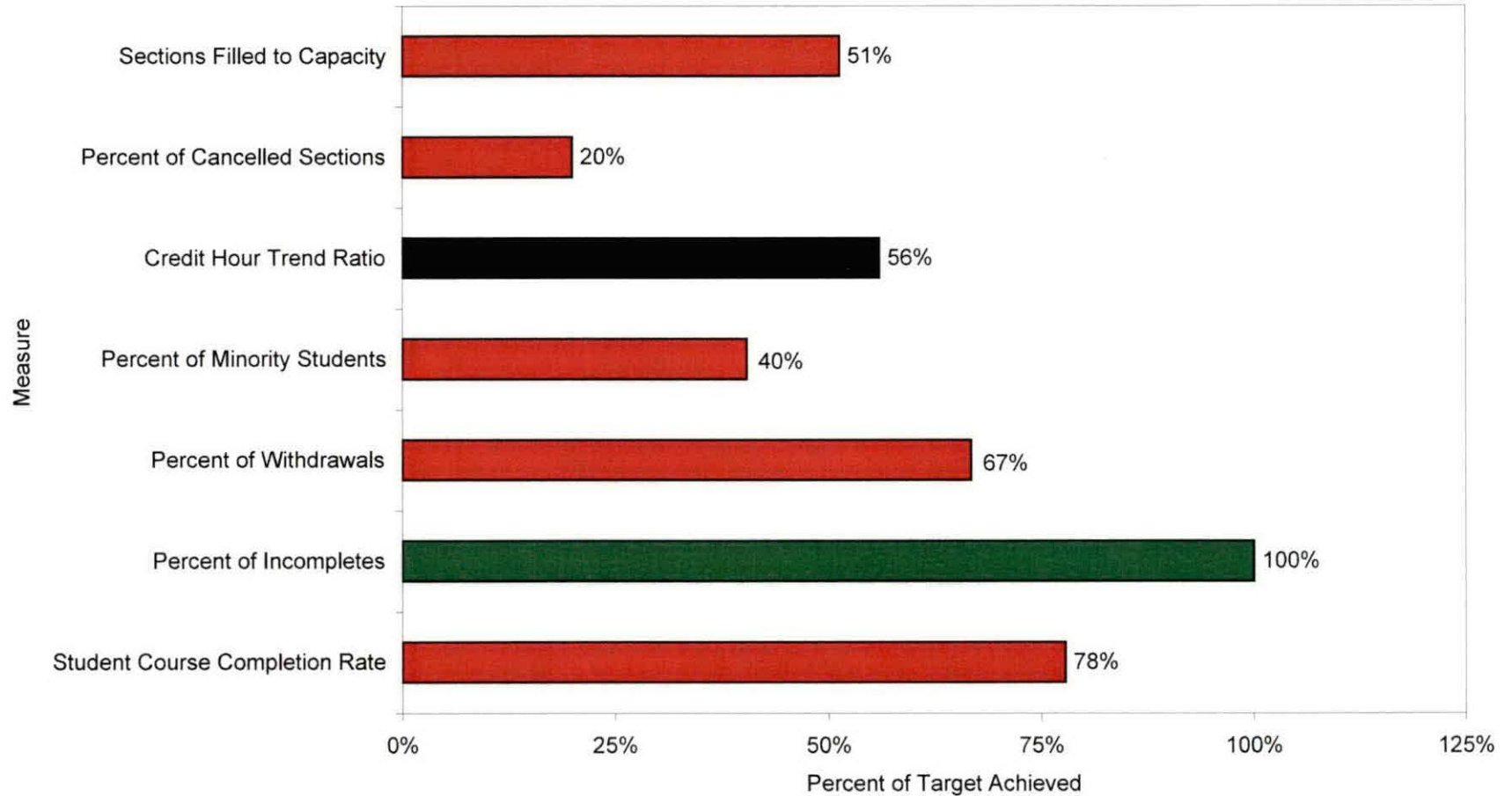
Oakland Community College Program Dashboard Percent of Targets Achieved

The following graph and table depict the extent to which each of the seven dashboard measures met established college-wide benchmarks. Benchmarks (targets and trouble scores) are based on historical data and reflect a range within which each measure is expected to perform.

Measures which exceed the established benchmark are depicted in green, while those that fall short of the benchmark are shown in red. This information is useful in identifying areas of excellence, as well as areas of concern. As a consequence, this report can help to identify specific areas which may require additional attention by program staff.

Oakland Community College Percent of Target Achieved 2007-08

Machine Tool Technology ATM



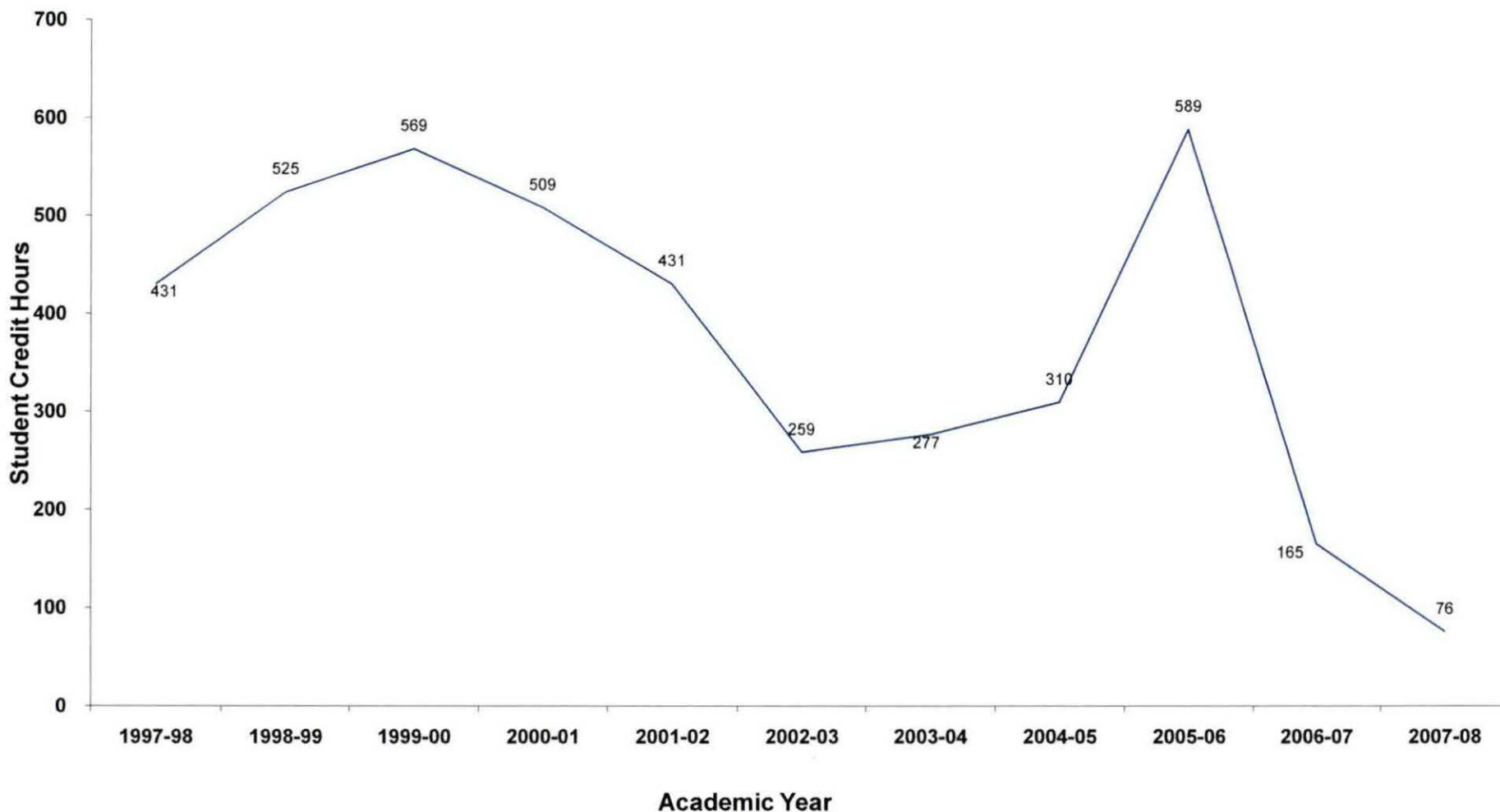
Oakland Community College Program Dashboard Report 2007-08

Machine Tool Technology ATM Dashboard Score: 5.96

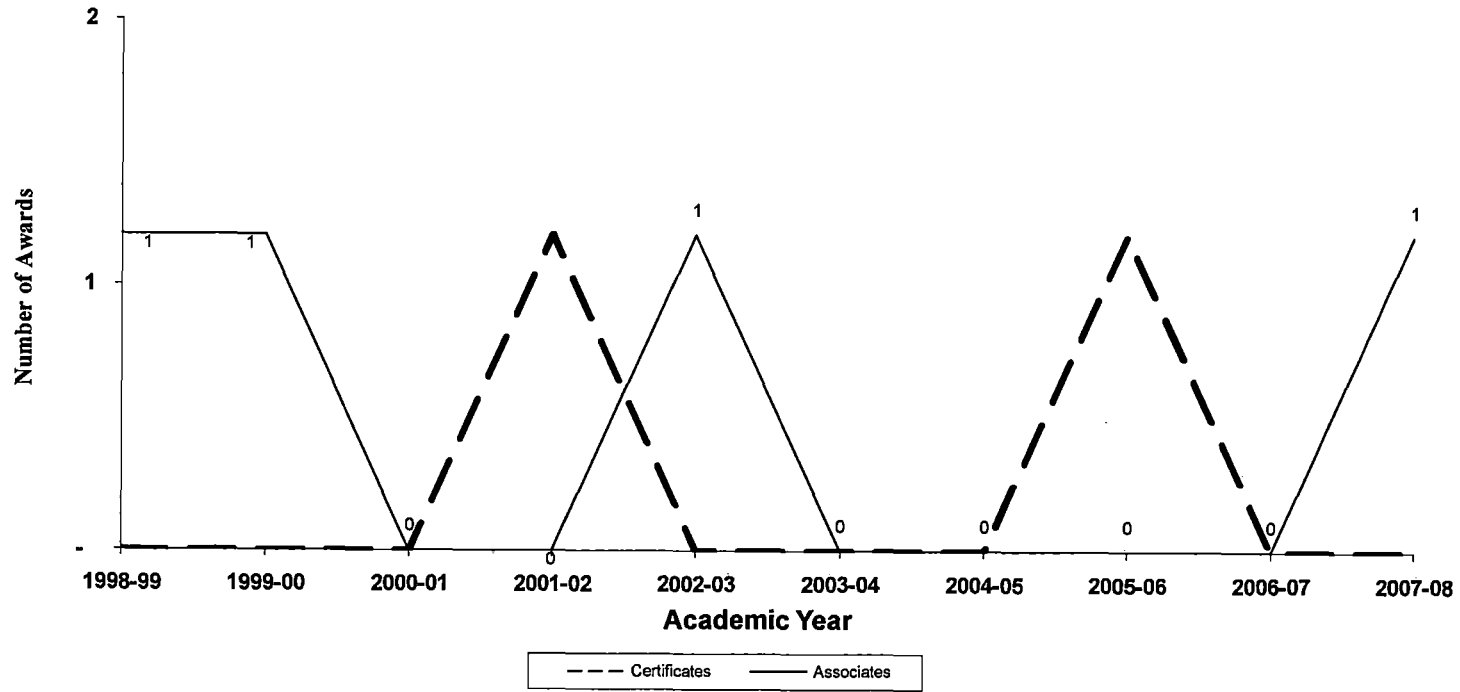
Measures	Benchmarks			Percent of Target Achieved	Weight	Weighted Score
	Current Score	Trouble Score	Target Score			
Sections Filled to Capacity	46.2%	75.0%	90.0%	51.3%	18.0%	0.92
Percent of Cancelled Sections	80.0%	25.0%	0.0%	20.0%	14.2%	0.28
Credit Hour Trend Ratio	0.76	0.68	1.36	56.0%	15.3%	0.86
Percent of Minority Students	8.3%	18.5%	20.6%	40.5%	6.1%	0.25
Percent of Withdrawals	33.3%	15.0%	0.0%	66.7%	12.0%	0.80
Percent of Incompletes	0.0%	3.0%	0.0%	100.0%	7.9%	0.79
Student Course Completion Rate	58.3%	60.0%	75.0%	77.8%	26.5%	2.06

**Oakland Community College
Ten-Year Trend in Student Credit Hours
Machine Tool Tech
1997-98 through 2007-08**

	1997-98 SCH	1998-99 SCH	1999-00 SCH	2000-01 SCH	2001-02 SCH	2002-03 SCH	2003-04 SCH	2004-05 SCH	2005-06 SCH	2006-07 SCH	2007-08 SCH	5-Year % Change	10-Year % Change
Machine Tool Tech	431	525	569	509	431	259	277	310	589	165	76	-70.7	-82.4
College Wide Totals	431,521	440,448	438,997	453,054	447,928	478,827	468,777	472,892	487,597	493,655	506,474	5.8	17.4

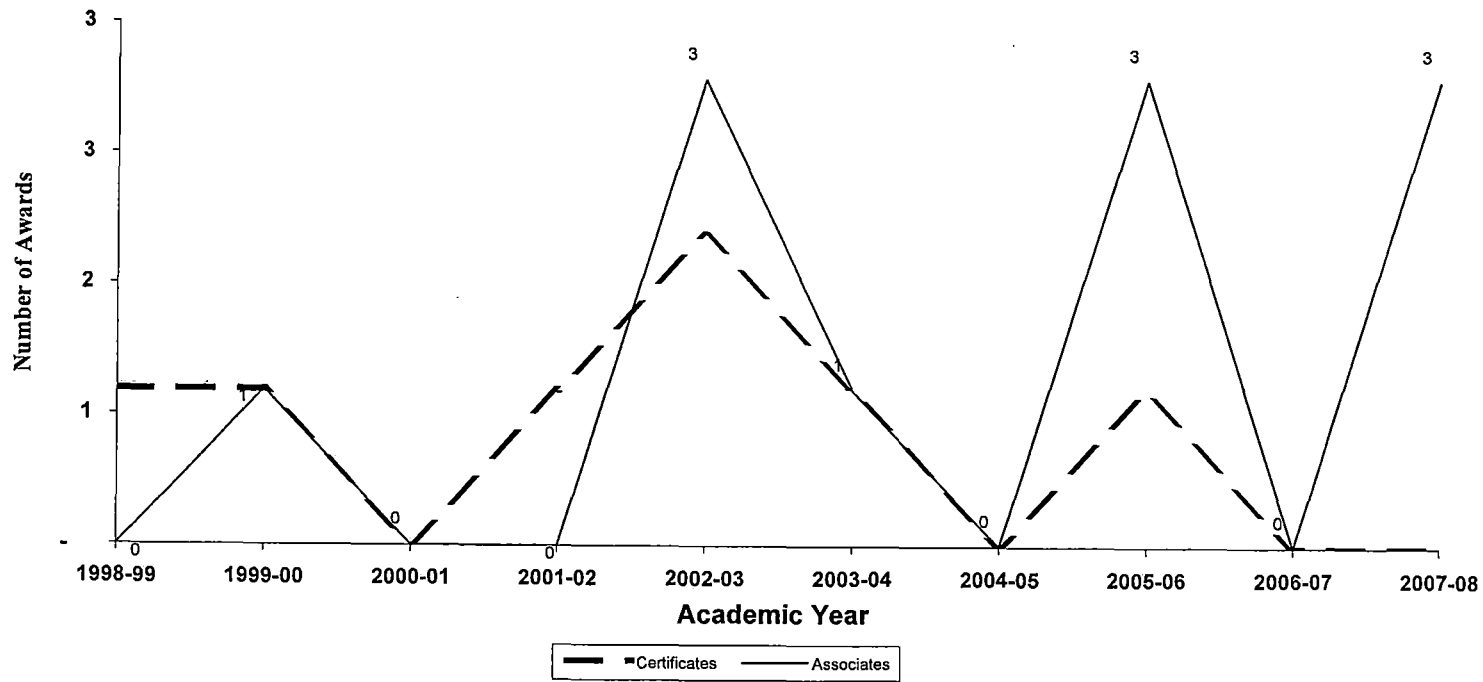


**Oakland Community College
Associate Degrees and Certificates Awarded
Machine Tool Technology
1998-99 through 2007-08**



<u>Academic Yr.</u>	<u>Certificates</u>	<u>Associates</u>
1998-99	0	1
1999-00	0	1
2000-01	0	0
2001-02	1	0
2002-03	0	1
2003-04	0	0
2004-05	0	0
2005-06	1	0
2006-07	0	0
2007-08	0	1

**Oakland Community College
Associate Degrees and Certificates Awarded
Machine Tool-Numerical Control
1998-99 through 2007-08**



<u>Academic Yr.</u>	<u>Certificates</u>	<u>Associates</u>
1998-99	1	0
1999-00	1	1
2000-01	0	0
2001-02	1	0
2002-03	2	3
2003-04	1	1
2004-05	0	0
2005-06	1	3
2006-07	0	0
2007-08	0	3

Occupational Projections (2008 – 2013)

The following projections are for those occupations most closely associated with this program based on national and regional labor market data. However, the extent to which specific OCC programs lead to employment within a given Standard Occupational Code (SOC) is dependent upon the way in which the U.S. Department of Labor groups specific occupations.

Occupational projections are presented at the "Detailed Standard Occupational Code" level as defined by the U.S. Department of Labor.

Although based on sound well tested economic modeling procedures, projections are subject to change based on emerging economic, political and social forces.

These projections reflect the four county region of Oakland, Macomb, Livingston and Wayne counties.

Projections are based on data from 24 major data sources, including the U.S. Department of Commerce, Bureau of Labor Statistics (BLS), Internal Revenue Service (IRS), and Census data. To forecast occupational demand at the county level, BLS data are regionalized and adjusted for emerging technological changes, the age of workers by occupation, and other factors affecting occupational demand.

Occupational forecast data was obtained from EMSI (Economic Modeling Specialists Inc.).

Region Info										
Region: SE Michigan Four-County Region										
County Areas: Livingston, Michigan (26093), Macomb, Michigan (26099), Oakland, Michigan (26125), Wayne, Michigan (26163)										
SOC Code	Description	2008 Jobs	2013 Jobs	Change	% Change	New & Rep. Jobs	% New & Rep.	2007 Median Hourly Earnings	2007 Avg Hourly Earnings	Education Level
51-4031	Cutting, punching, and press machine setters, operators, and tenders, metal and plastic	10,607	9,532	(1,075)	(10%)	1,101	10%	\$14.72	\$16.13	Moderate-term on-the-job training
51-4032	Drilling and boring machine tool setters, operators, and tenders, metal and plastic	1,755	1,514	(241)	(14%)	156	9%	\$18.21	\$18.6	Moderate-term on-the-job training
51-4033	Grinding, lapping, polishing, and buffing machine tool setters, operators, and tenders, metal and plastic	2,915	2,672	(243)	(8%)	149	5%	\$20.4	\$20.13	Moderate-term on-the-job training
51-4034	Lathe and turning machine tool setters, operators, and tenders, metal and plastic	2,119	1,851	(268)	(13%)	214	10%	\$20.73	\$20.85	Moderate-term on-the-job training
51-4035	Milling and planing machine setters, operators, and tenders, metal and plastic	552	499	(53)	(10%)	36	7%	\$18.96	\$18.92	Moderate-term on-the-job training
51-4041	Machinists	10,799	10,779	(20)	(0%)	1,009	9%	\$20.02	\$20.54	Long-term on-the-job training
51-4081	Multiple machine tool setters, operators, and tenders, metal and plastic	2,433	2,369	(64)	(3%)	191	8%	\$16.84	\$18.61	Moderate-term on-the-job training
		31,180	29,216	-1,963	-6%	2,857	9%	\$17.91	\$18.72	

Source: EMSI Covered Employment - Spring 2008 Release v. 2

Machine Tool Numerical Control Technology Occupation Projections 2008-2013

Region Info										
Region: SE Michigan Four-County Region										
County Areas: Livingston, Michigan (26093), Macomb, Michigan (26099), Oakland, Michigan (26125), Wayne, Michigan (26163)										
SOC Code	Description	2008 Jobs	2013 Jobs	% Change	% New Rep.	New & Rep. Jobs	% New & Rep.	2007 Median Hourly Earnings	2007 Avg Hourly Earnings	Education Level
51-4011	Computer-controlled machine tool operators, metal and plastic	4,216	4,183	(33)	(1%)	292	7%	\$16.81	\$17.78	Moderate-term on-the-job training
51-4012	Numerical tool and process control programmers	591	562	(29)	(5%)	34	6%	\$23.11	\$23.7	Long-term on-the-job training
		4,807	4,745	-63	-1%	324	7%	\$17.59	\$18.52	
Source: EMSI Covered Employment - Spring 2008 Release v. 2										

Occupational Skills Analysis

The following report provides detailed information on the knowledge, skills and abilities required for a given occupation. Consideration of these different competencies and levels of attainment while designing and reviewing curriculum will ensure that students enrolled in our programs are adequately prepared for employment.

In particular this report provides:

Importance of the competency to the occupation (in general terms)

- Not important
- Somewhat important
- Important
- Very important
- Extremely important

Importance of the competency to the occupation (in specific terms).

- 0 to 20 = not important
- 21 to 40 = somewhat important
- 41 to 60 = important
- 61 to 80 = very important
- 81 to 100 = extremely important

Level of Attainment in the competency required by the occupation:

- Basic = 0 to 24
- Intermediate = 25 to 49
- Advanced = 50 to 74
- Expert = 75 to 100

Current Occupation

51-4031.00 - Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic

Set up, operate, or tend machines to saw, cut, shear, slit, punch, crimp, notch, bend, or straighten metal or plastic material.

Occupational Knowledge

Knowledge	Importance	Imp (0-100)	Level	Lvl (0-100)
Mechanical	Important	50	Intermediate	46
Education and Training	Somewhat Important	48	Intermediate	45
Production and Processing	Important	65	Intermediate	44
Administration and Management	Important	52	Intermediate	41
Mathematics	Important	54	Intermediate	41
English Language	Somewhat Important	44	Intermediate	36
Chemistry	Somewhat Important	29	Intermediate	32
Customer and Personal Service	Somewhat Important	32	Intermediate	31
Public Safety and Security	Somewhat Important	34	Intermediate	29
Engineering and Technology	Somewhat Important	30	Intermediate	29
Computers and Electronics	Somewhat Important	26	Intermediate	26
Clerical	Somewhat Important	26	Basic	24
Transportation	Somewhat Important	26	Basic	23
Design	Not Important	21	Basic	21
Personnel and Human Resources	Not Important	21	Basic	20
Psychology	Not Important	20	Basic	17
Physics	Not Important	18	Basic	15
Economics and Accounting	Not Important	16	Basic	15
Communications and Media	Not Important	13	Basic	14
Sales and Marketing	Not Important	16	Basic	14
Building and Construction	Not Important	11	Basic	12
Law and Government	Not Important	10	Basic	10
Therapy and Counseling	Not Important	7	Basic	9
Philosophy and Theology	Not Important	9	Basic	8
Telecommunications	Not Important	9	Basic	6
Foreign Language	Not Important	8	Basic	6
Biology	Not Important	5	Basic	5
History and Archeology	Not Important	4	Basic	5
Sociology and Anthropology	Not Important	4	Basic	4
Medicine and Dentistry	Not Important	5	Basic	3
Geography	Not Important	3	Basic	3
Fine Arts	Not Important	2	Basic	2
Food Production	Not Important	7	Basic	1

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Occupational Skills

Skill	Importance	Imp (0-100)	Level	Lvl (0-100)
Quality Control Analysis	Very Important	80	Advanced	64
Operation and Control	Important	71	Advanced	59
Operation Monitoring	Important	72	Advanced	58
Troubleshooting	Important	73	Advanced	58
Learning Strategies	Important	60	Advanced	56
Active Learning	Important	62	Advanced	54
Instructing	Important	68	Advanced	54
Equipment Selection	Important	62	Advanced	54
Coordination	Important	58	Advanced	54
Critical Thinking	Important	57	Advanced	53
Equipment Maintenance	Important	66	Advanced	53
Monitoring	Important	62	Advanced	53
Active Listening	Important	70	Advanced	52
Reading Comprehension	Important	65	Intermediate	49
Mathematics	Important	60	Intermediate	48
Repairing	Important	57	Intermediate	47
Speaking	Important	55	Intermediate	47
Complex Problem Solving	Important	55	Intermediate	45
Judgment and Decision Making	Important	57	Intermediate	44
Time Management	Important	57	Intermediate	44
Installation	Somewhat Important	45	Intermediate	42
Social Perceptiveness	Somewhat Important	47	Intermediate	42
Writing	Somewhat Important	49	Intermediate	41
Systems Evaluation	Somewhat Important	40	Intermediate	38
Service Orientation	Somewhat Important	45	Intermediate	38
Systems Analysis	Somewhat Important	38	Intermediate	36
Persuasion	Somewhat Important	32	Intermediate	35
Technology Design	Somewhat Important	37	Intermediate	35
Management of Personnel Resources	Somewhat Important	35	Intermediate	34
Operations Analysis	Somewhat Important	36	Intermediate	31
Negotiation	Somewhat Important	33	Intermediate	28
Management of Material Resources	Somewhat Important	35	Intermediate	26
Programming	Not Important	22	Basic	17
Management of Financial Resources	Not Important	16	Basic	16
Science	Not Important	14	Basic	15

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Occupational Abilities

Ability	Importance	Imp (0-100)	Level	Lvl (0-100)
Control Precision	Very Important	75	Advanced	50
Visualization	Important	66	Intermediate	49
Manual Dexterity	Important	69	Intermediate	46
Information Ordering	Important	69	Intermediate	46
Near Vision	Important	64	Intermediate	44
Arm-Hand Steadiness	Important	59	Intermediate	44
Extent Flexibility	Somewhat Important	49	Intermediate	43
Finger Dexterity	Important	54	Intermediate	42
Static Strength	Important	50	Intermediate	41
Multilimb Coordination	Important	54	Intermediate	39
Wrist-Finger Speed	Somewhat Important	49	Intermediate	38
Written Comprehension	Important	59	Intermediate	38
Reaction Time	Somewhat Important	34	Intermediate	36
Problem Sensitivity	Important	53	Intermediate	34
Trunk Strength	Somewhat Important	45	Intermediate	34
Selective Attention	Somewhat Important	41	Intermediate	32
Number Facility	Somewhat Important	41	Intermediate	31
Perceptual Speed	Somewhat Important	40	Intermediate	31
Deductive Reasoning	Somewhat Important	39	Intermediate	31
Explosive Strength	Somewhat Important	31	Intermediate	30
Depth Perception	Somewhat Important	32	Intermediate	30
Response Orientation	Somewhat Important	30	Intermediate	29
Dynamic Strength	Somewhat Important	39	Intermediate	29
Spatial Orientation	Somewhat Important	31	Intermediate	28
Oral Comprehension	Somewhat Important	29	Intermediate	28
Time Sharing	Somewhat Important	26	Intermediate	28
Speed of Limb Movement	Somewhat Important	25	Intermediate	27
Memorization	Somewhat Important	29	Intermediate	27
Category Flexibility	Somewhat Important	26	Intermediate	26
Mathematical Reasoning	Somewhat Important	34	Intermediate	26
Far Vision	Not Important	21	Intermediate	25
Stamina	Somewhat Important	31	Intermediate	25
Speed of Closure	Not Important	20	Intermediate	25
Visual Color Discrimination	Not Important	24	Basic	24
Gross Body Coordination	Somewhat Important	30	Basic	24
Auditory Attention	Not Important	16	Basic	23
Inductive Reasoning	Not Important	18	Basic	23
Fluency of Ideas	Not Important	18	Basic	22
Rate Control	Somewhat Important	31	Basic	22
Originality	Not Important	16	Basic	21
Hearing Sensitivity	Not Important	20	Basic	21
Oral Expression	Not Important	15	Basic	21
Flexibility of Closure	Not Important	18	Basic	21
Written Expression	Not Important	18	Basic	20
Dynamic Flexibility	Not Important	18	Basic	19
Sound Localization	Not Important	13	Basic	18
Gross Body Equilibrium	Not Important	15	Basic	17
Speech Recognition	Not Important	11	Basic	16
Peripheral Vision	Not Important	16	Basic	16
Speech Clarity	Not Important	11	Basic	16
Glare Sensitivity	Not Important	9	Basic	10
Night Vision	Not Important	4	Basic	9

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Current Occupation

51-4032.00 - Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic

Set up, operate, or tend drilling machines to drill, bore, ream, mill, or countersink metal or plastic work pieces.

Occupational Knowledge

Knowledge	Importance	Imp (0-100)	Level	Lvl (0-100)
Mechanical	Very Important	80	Advanced	66
Mathematics	Important	70	Advanced	59
Production and Processing	Important	67	Advanced	52
Engineering and Technology	Somewhat Important	49	Intermediate	49
Design	Important	57	Intermediate	47
English Language	Important	51	Intermediate	46
Education and Training	Important	50	Intermediate	46
Customer and Personal Service	Important	53	Intermediate	45
Computers and Electronics	Important	52	Intermediate	42
Administration and Management	Somewhat Important	46	Intermediate	42
Public Safety and Security	Somewhat Important	43	Intermediate	36
Personnel and Human Resources	Somewhat Important	36	Intermediate	31
Building and Construction	Somewhat Important	27	Intermediate	30
Chemistry	Somewhat Important	27	Intermediate	30
Clerical	Somewhat Important	30	Intermediate	30
Physics	Somewhat Important	27	Intermediate	26
Transportation	Not Important	23	Basic	24
Sales and Marketing	Not Important	22	Basic	23
Communications and Media	Not Important	17	Basic	20
Telecommunications	Not Important	17	Basic	19
Law and Government	Not Important	22	Basic	19
Psychology	Not Important	13	Basic	18
Economics and Accounting	Not Important	14	Basic	14
Food Production	Not Important	10	Basic	10
Medicine and Dentistry	Not Important	11	Basic	9
Therapy and Counseling	Not Important	8	Basic	9
Sociology and Anthropology	Not Important	8	Basic	6
History and Archeology	Not Important	4	Basic	5
Foreign Language	Not Important	7	Basic	5
Geography	Not Important	3	Basic	2
Biology	Not Important	1	Basic	1
Philosophy and Theology	Not Important	1	Basic	1
Fine Arts	Not Important	1	Basic	1

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Occupational Skills

Skill	Importance	Imp (0-100)	Level	Lvl (0-100)
Equipment Selection	Important	69	Advanced	68
Operation Monitoring	Important	74	Advanced	67
Quality Control Analysis	Important	72	Advanced	63
Active Learning	Important	61	Advanced	63
Equipment Maintenance	Important	70	Advanced	61
Instructing	Important	70	Advanced	59
Learning Strategies	Important	64	Advanced	56
Monitoring	Important	52	Advanced	52
Mathematics	Very Important	75	Advanced	51
Installation	Somewhat Important	49	Advanced	50
Writing	Important	54	Intermediate	49
Active Listening	Important	70	Intermediate	48
Reading Comprehension	Important	72	Intermediate	48
Repairing	Important	55	Intermediate	48
Time Management	Important	57	Intermediate	48
Technology Design	Somewhat Important	46	Intermediate	47
Troubleshooting	Important	51	Intermediate	47
Operation and Control	Important	55	Intermediate	47
Critical Thinking	Important	53	Intermediate	45
Coordination	Somewhat Important	43	Intermediate	44
Operations Analysis	Somewhat Important	43	Intermediate	43
Programming	Somewhat Important	49	Intermediate	42
Service Orientation	Somewhat Important	44	Intermediate	39
Judgment and Decision Making	Important	50	Intermediate	39
Systems Evaluation	Somewhat Important	44	Intermediate	38
Speaking	Important	51	Intermediate	35
Social Perceptiveness	Somewhat Important	31	Intermediate	33
Systems Analysis	Somewhat Important	34	Intermediate	32
Complex Problem Solving	Somewhat Important	33	Intermediate	30
Management of Material Resources	Somewhat Important	35	Intermediate	30
Persuasion	Not Important	18	Intermediate	26
Negotiation	Somewhat Important	25	Basic	24
Management of Financial Resources	Somewhat Important	26	Basic	22
Management of Personnel Resources	Somewhat Important	26	Basic	22
Science	Not Important	21	Basic	21

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Occupational Abilities

Ability	Importance	Imp (0-100)	Level	Lvl (0-100)
Control Precision	Important	63	Advanced	52
Near Vision	Important	63	Advanced	52
Finger Dexterity	Important	56	Advanced	50
Static Strength	Important	60	Intermediate	48
Reaction Time	Somewhat Important	47	Intermediate	46
Oral Comprehension	Important	60	Intermediate	46
Written Comprehension	Important	60	Intermediate	46
Oral Expression	Important	53	Intermediate	46
Manual Dexterity	Important	63	Intermediate	45
Perceptual Speed	Important	50	Intermediate	45
Selective Attention	Somewhat Important	47	Intermediate	45
Arm-Hand Steadiness	Important	66	Intermediate	45
Information Ordering	Important	53	Intermediate	43
Category Flexibility	Somewhat Important	44	Intermediate	43
Visualization	Important	53	Intermediate	43
Multilimb Coordination	Important	56	Intermediate	43
Deductive Reasoning	Important	50	Intermediate	43
Trunk Strength	Important	53	Intermediate	43
Auditory Attention	Somewhat Important	35	Intermediate	41
Problem Sensitivity	Important	56	Intermediate	41
Inductive Reasoning	Important	53	Intermediate	41
Written Expression	Somewhat Important	41	Intermediate	39
Depth Perception	Somewhat Important	44	Intermediate	39
Response Orientation	Somewhat Important	35	Intermediate	39
Rate Control	Important	50	Intermediate	39
Hearing Sensitivity	Somewhat Important	38	Intermediate	38
Visual Color Discrimination	Somewhat Important	41	Intermediate	36
Extent Flexibility	Somewhat Important	25	Intermediate	36
Speech Clarity	Somewhat Important	44	Intermediate	36
Time Sharing	Somewhat Important	35	Intermediate	36
Flexibility of Closure	Somewhat Important	47	Intermediate	36
Far Vision	Somewhat Important	41	Intermediate	34
Mathematical Reasoning	Somewhat Important	35	Intermediate	34
Speech Recognition	Somewhat Important	44	Intermediate	34
Number Facility	Somewhat Important	35	Intermediate	32
Fluency of Ideas	Somewhat Important	35	Intermediate	30
Stamina	Somewhat Important	38	Intermediate	27
Memorization	Somewhat Important	28	Intermediate	27
Originality	Somewhat Important	31	Intermediate	25
Dynamic Strength	Somewhat Important	31	Intermediate	25
Speed of Closure	Somewhat Important	28	Basic	21
Gross Body Coordination	Not Important	22	Basic	20
Wrist-Finger Speed	Not Important	22	Basic	18
Spatial Orientation	Not Important	19	Basic	18
Speed of Limb Movement	Not Important	19	Basic	14
Gross Body Equilibrium	Not Important	19	Basic	14
Sound Localization	Not Important	16	Basic	11
Night Vision	Not Important	16	Basic	11
Peripheral Vision	Not Important	16	Basic	11
Glare Sensitivity	Not Important	16	Basic	11
Explosive Strength	Not Important	13	Basic	9
Dynamic Flexibility	Not Important	9	Basic	7

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Current Occupation

51-4033.00 - Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic

Set up, operate, or tend grinding and related tools that remove excess material or burrs from surfaces, sharpen edges or corners, or buff, hone, or polish metal or plastic work pieces.

Occupational Knowledge

Knowledge	Importance	Imp (0-100)	Level	Lvl (0-100)
Mechanical	Important	63	Advanced	59
Production and Processing	Important	56	Advanced	50
Mathematics	Important	50	Intermediate	44
Design	Somewhat Important	36	Intermediate	41
Engineering and Technology	Somewhat Important	36	Intermediate	40
Education and Training	Somewhat Important	38	Intermediate	39
Customer and Personal Service	Somewhat Important	30	Intermediate	32
English Language	Somewhat Important	41	Intermediate	28
Administration and Management	Somewhat Important	30	Intermediate	28
Computers and Electronics	Somewhat Important	25	Intermediate	27
Chemistry	Somewhat Important	30	Basic	24
Personnel and Human Resources	Not Important	20	Basic	24
Psychology	Not Important	19	Basic	22
Public Safety and Security	Not Important	22	Basic	21
Clerical	Not Important	17	Basic	20
Physics	Not Important	20	Basic	18
Transportation	Not Important	16	Basic	17
Sociology and Anthropology	Not Important	12	Basic	12
Philosophy and Theology	Not Important	7	Basic	11
Law and Government	Not Important	15	Basic	11
Medicine and Dentistry	Not Important	10	Basic	11
Sales and Marketing	Not Important	11	Basic	11
Foreign Language	Not Important	16	Basic	10
Communications and Media	Not Important	9	Basic	9
Economics and Accounting	Not Important	10	Basic	9
Building and Construction	Not Important	10	Basic	9
Therapy and Counseling	Not Important	6	Basic	8
Geography	Not Important	5	Basic	8
Telecommunications	Not Important	12	Basic	7
Biology	Not Important	6	Basic	7
Fine Arts	Not Important	3	Basic	4
Food Production	Not Important	8	Basic	1
History and Archeology	Not Important	1	Basic	1

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Occupational Skills

Skill	Importance	Imp (0-100)	Level	Lvl (0-100)
Quality Control Analysis	Important	70	Advanced	62
Monitoring	Important	54	Advanced	57
Operation Monitoring	Important	65	Advanced	55
Learning Strategies	Important	53	Advanced	54
Mathematics	Important	69	Advanced	54
Equipment Maintenance	Important	56	Advanced	53
Equipment Selection	Important	61	Advanced	52
Operation and Control	Important	62	Advanced	50
Critical Thinking	Important	54	Intermediate	48
Instructing	Important	54	Intermediate	47
Active Learning	Somewhat Important	49	Intermediate	47
Persuasion	Somewhat Important	36	Intermediate	46
Troubleshooting	Important	59	Intermediate	46
Complex Problem Solving	Important	56	Intermediate	45
Coordination	Somewhat Important	44	Intermediate	45
Installation	Somewhat Important	49	Intermediate	44
Judgment and Decision Making	Important	51	Intermediate	43
Operations Analysis	Somewhat Important	45	Intermediate	42
Systems Analysis	Somewhat Important	44	Intermediate	38
Systems Evaluation	Somewhat Important	43	Intermediate	38
Repairing	Somewhat Important	46	Intermediate	38
Time Management	Somewhat Important	45	Intermediate	37
Technology Design	Somewhat Important	41	Intermediate	37
Reading Comprehension	Important	52	Intermediate	36
Social Perceptiveness	Somewhat Important	41	Intermediate	36
Speaking	Somewhat Important	40	Intermediate	34
Active Listening	Somewhat Important	34	Intermediate	29
Writing	Somewhat Important	31	Intermediate	28
Service Orientation	Somewhat Important	25	Intermediate	25
Science	Not Important	18	Basic	24
Programming	Somewhat Important	33	Basic	23
Negotiation	Somewhat Important	31	Basic	22
Management of Material Resources	Not Important	19	Basic	19
Management of Personnel Resources	Not Important	18	Basic	15
Management of Financial Resources	Not Important	11	Basic	10

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Occupational Abilities

Ability	Importance	Imp (0-100)	Level	Lvl (0-100)
Control Precision	Very Important	85	Advanced	53
Manual Dexterity	Important	65	Intermediate	46
Visualization	Important	60	Intermediate	46
Near Vision	Important	65	Intermediate	44
Static Strength	Somewhat Important	48	Intermediate	43
Written Comprehension	Important	53	Intermediate	40
Arm-Hand Steadiness	Important	55	Intermediate	39
Extent Flexibility	Somewhat Important	45	Intermediate	37
Finger Dexterity	Important	50	Intermediate	36
Number Facility	Somewhat Important	40	Intermediate	36
Trunk Strength	Somewhat Important	43	Intermediate	36
Information Ordering	Important	57	Intermediate	34
Wrist-Finger Speed	Important	55	Intermediate	34
Multilimb Coordination	Somewhat Important	48	Intermediate	31
Selective Attention	Somewhat Important	30	Intermediate	31
Speed of Limb Movement	Somewhat Important	32	Intermediate	29
Problem Sensitivity	Somewhat Important	48	Intermediate	29
Memorization	Somewhat Important	25	Intermediate	29
Reaction Time	Not Important	22	Intermediate	27
Mathematical Reasoning	Somewhat Important	30	Intermediate	27
Response Orientation	Somewhat Important	25	Intermediate	27
Deductive Reasoning	Somewhat Important	30	Intermediate	27
Perceptual Speed	Somewhat Important	30	Intermediate	26
Depth Perception	Somewhat Important	25	Intermediate	26
Stamina	Somewhat Important	28	Basic	24
Spatial Orientation	Somewhat Important	28	Basic	24
Dynamic Flexibility	Somewhat Important	28	Basic	24
Explosive Strength	Not Important	18	Basic	24
Dynamic Strength	Somewhat Important	28	Basic	24
Visual Color Discrimination	Somewhat Important	25	Basic	23
Oral Expression	Not Important	20	Basic	23
Hearing Sensitivity	Not Important	15	Basic	23
Far Vision	Not Important	18	Basic	21
Gross Body Coordination	Somewhat Important	28	Basic	21
Oral Comprehension	Not Important	20	Basic	21
Speed of Closure	Not Important	18	Basic	21
Flexibility of Closure	Not Important	22	Basic	21
Time Sharing	Not Important	20	Basic	20
Rate Control	Somewhat Important	25	Basic	20
Inductive Reasoning	Not Important	20	Basic	20
Written Expression	Not Important	15	Basic	19
Category Flexibility	Not Important	20	Basic	19
Fluency of Ideas	Not Important	20	Basic	19
Auditory Attention	Not Important	8	Basic	17
Sound Localization	Not Important	10	Basic	16
Originality	Not Important	13	Basic	16
Speech Clarity	Not Important	13	Basic	14
Gross Body Equilibrium	Not Important	13	Basic	14
Speech Recognition	Not Important	8	Basic	13
Peripheral Vision	Not Important	8	Basic	10
Glare Sensitivity	Not Important	8	Basic	9
Night Vision	Not Important	0	Basic	7

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Current Occupation

51-4034.00 - Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic

Set up, operate, or tend lathe and turning machines to turn, bore, thread, form, or face metal or plastic materials, such as wire, rod, or bar stock.

Occupational Knowledge

Knowledge	Importance	Imp (0-100)	Level	Lvl (0-100)
Mechanical	Important	72	Advanced	68
Mathematics	Important	68	Advanced	66
Design	Important	58	Advanced	51
Engineering and Technology	Somewhat Important	40	Advanced	51
Production and Processing	Important	63	Intermediate	46
Education and Training	Somewhat Important	40	Intermediate	44
Computers and Electronics	Somewhat Important	42	Intermediate	43
Administration and Management	Somewhat Important	37	Intermediate	36
Physics	Somewhat Important	30	Intermediate	28
Customer and Personal Service	Not Important	23	Intermediate	25
English Language	Somewhat Important	28	Basic	24
Chemistry	Not Important	14	Basic	19
Public Safety and Security	Not Important	19	Basic	18
Sales and Marketing	Not Important	20	Basic	16
Clerical	Not Important	17	Basic	15
Building and Construction	Not Important	9	Basic	13
Personnel and Human Resources	Not Important	15	Basic	13
Transportation	Not Important	13	Basic	13
Economics and Accounting	Not Important	14	Basic	9
Psychology	Not Important	7	Basic	7
Foreign Language	Not Important	4	Basic	6
Geography	Not Important	3	Basic	5
Philosophy and Theology	Not Important	3	Basic	5
Communications and Media	Not Important	3	Basic	4
Law and Government	Not Important	3	Basic	3
Telecommunications	Not Important	2	Basic	2
Therapy and Counseling	Not Important	1	Basic	2
History and Archeology	Not Important	1	Basic	1
Medicine and Dentistry	Not Important	1	Basic	1
Sociology and Anthropology	Not Important	3	Basic	1
Fine Arts	Not Important	1	Basic	0
Food Production	Not Important	0	Basic	0
Biology	Not Important	0	Basic	0

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Occupational Skills

Skill	Importance	Imp (0-100)	Level	Lvl (0-100)
Mathematics	Very Important	78	Advanced	66
Operation Monitoring	Very Important	78	Advanced	64
Equipment Maintenance	Important	63	Advanced	63
Equipment Selection	Important	70	Advanced	62
Quality Control Analysis	Important	63	Advanced	62
Instructing	Important	60	Advanced	59
Operation and Control	Important	66	Advanced	58
Critical Thinking	Important	62	Advanced	58
Active Learning	Important	60	Advanced	58
Active Listening	Important	67	Advanced	55
Repairing	Important	56	Advanced	55
Troubleshooting	Important	58	Advanced	54
Reading Comprehension	Important	52	Advanced	54
Learning Strategies	Important	55	Advanced	50
Monitoring	Somewhat Important	49	Intermediate	49
Installation	Somewhat Important	43	Intermediate	48
Speaking	Somewhat Important	49	Intermediate	45
Complex Problem Solving	Important	56	Intermediate	45
Operations Analysis	Somewhat Important	40	Intermediate	44
Coordination	Important	50	Intermediate	44
Science	Somewhat Important	40	Intermediate	41
Technology Design	Somewhat Important	33	Intermediate	39
Social Perceptiveness	Somewhat Important	31	Intermediate	37
Writing	Somewhat Important	38	Intermediate	36
Judgment and Decision Making	Somewhat Important	39	Intermediate	35
Time Management	Somewhat Important	44	Intermediate	33
Programming	Somewhat Important	46	Intermediate	33
Service Orientation	Not Important	23	Intermediate	28
Systems Analysis	Somewhat Important	33	Intermediate	26
Negotiation	Somewhat Important	26	Intermediate	25
Systems Evaluation	Somewhat Important	32	Basic	23
Management of Material Resources	Not Important	22	Basic	22
Management of Personnel Resources	Not Important	23	Basic	21
Persuasion	Not Important	16	Basic	19
Management of Financial Resources	Not Important	10	Basic	11

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Occupational Abilities

Ability	Importance	Imp (0-100)	Level	Lvl (0-100)
Control Precision	Important	69	Advanced	52
Near Vision	Important	60	Intermediate	48
Problem Sensitivity	Important	56	Intermediate	46
Oral Comprehension	Important	53	Intermediate	46
Finger Dexterity	Important	63	Intermediate	46
Reaction Time	Important	63	Intermediate	45
Multilimb Coordination	Important	53	Intermediate	45
Written Comprehension	Somewhat Important	47	Intermediate	43
Arm-Hand Steadiness	Important	66	Intermediate	43
Oral Expression	Important	53	Intermediate	43
Trunk Strength	Important	50	Intermediate	43
Information Ordering	Important	50	Intermediate	43
Static Strength	Important	53	Intermediate	43
Selective Attention	Important	53	Intermediate	41
Manual Dexterity	Important	53	Intermediate	41
Visualization	Somewhat Important	47	Intermediate	41
Depth Perception	Somewhat Important	44	Intermediate	39
Deductive Reasoning	Somewhat Important	47	Intermediate	38
Inductive Reasoning	Somewhat Important	47	Intermediate	38
Flexibility of Closure	Somewhat Important	41	Intermediate	38
Extent Flexibility	Somewhat Important	35	Intermediate	38
Hearing Sensitivity	Somewhat Important	38	Intermediate	36
Written Expression	Somewhat Important	38	Intermediate	36
Auditory Attention	Somewhat Important	35	Intermediate	36
Perceptual Speed	Somewhat Important	41	Intermediate	36
Visual Color Discrimination	Somewhat Important	28	Intermediate	34
Category Flexibility	Somewhat Important	41	Intermediate	34
Speech Recognition	Somewhat Important	44	Intermediate	34
Speech Clarity	Somewhat Important	47	Intermediate	32
Response Orientation	Somewhat Important	35	Intermediate	32
Rate Control	Somewhat Important	41	Intermediate	32
Far Vision	Somewhat Important	38	Intermediate	32
Mathematical Reasoning	Somewhat Important	31	Intermediate	30
Number Facility	Somewhat Important	31	Intermediate	30
Time Sharing	Somewhat Important	28	Intermediate	29
Fluency of Ideas	Somewhat Important	31	Intermediate	29
Dynamic Strength	Somewhat Important	31	Intermediate	27
Stamina	Somewhat Important	35	Intermediate	27
Gross Body Coordination	Somewhat Important	25	Intermediate	25
Wrist-Finger Speed	Not Important	22	Basic	23
Speed of Limb Movement	Somewhat Important	25	Basic	23
Originality	Somewhat Important	28	Basic	23
Memorization	Not Important	22	Basic	20
Speed of Closure	Not Important	22	Basic	18
Sound Localization	Not Important	19	Basic	16
Spatial Orientation	Not Important	16	Basic	11
Night Vision	Not Important	16	Basic	11
Gross Body Equilibrium	Not Important	13	Basic	9
Glare Sensitivity	Not Important	16	Basic	9
Peripheral Vision	Not Important	13	Basic	7
Explosive Strength	Not Important	3	Basic	5
Dynamic Flexibility	Not Important	3	Basic	2

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Current Occupation

51-4035.00 - Milling and Planing Machine Setters, Operators, and Tenders, Metal and Plastic

Set up, operate, or tend milling or planing machines to mill, plane, shape, groove, or profile metal or plastic work pieces.

Occupational Knowledge

Knowledge	Importance	Imp (0-100)	Level	Lvl (0-100)
Production and Processing	Very Important	79	Advanced	50
Mechanical	Very Important	79	Intermediate	48
Mathematics	Important	71	Intermediate	38
Physics	Important	54	Intermediate	33
Engineering and Technology	Important	50	Intermediate	31
Design	Somewhat Important	46	Intermediate	29
English Language	Somewhat Important	29	Basic	19
Building and Construction	Not Important	21	Basic	14
Clerical	Not Important	16	Basic	14
Computers and Electronics	Not Important	8	Basic	9
Communications and Media	Not Important	16	Basic	9
Chemistry	Not Important	13	Basic	9
Education and Training	Not Important	0	Basic	7
Public Safety and Security	Not Important	16	Basic	7
Administration and Management	Not Important	0	Basic	7
Telecommunications	Not Important	4	Basic	7
Economics and Accounting	Not Important	4	Basic	5
Sales and Marketing	Not Important	0	Basic	5
Transportation	Not Important	0	Basic	5
Customer and Personal Service	Not Important	0	Basic	5
Psychology	Not Important	4	Basic	5
Personnel and Human Resources	Not Important	0	Basic	5
Sociology and Anthropology	Not Important	4	Basic	5
Geography	Not Important	0	Basic	5
Therapy and Counseling	Not Important	0	Basic	0
Biology	Not Important	0	Basic	0
Philosophy and Theology	Not Important	0	Basic	0
Foreign Language	Not Important	0	Basic	0
Fine Arts	Not Important	0	Basic	0
Law and Government	Not Important	0	Basic	0
History and Archeology	Not Important	0	Basic	0
Food Production	Not Important	0	Basic	0
Medicine and Dentistry	Not Important	0	Basic	0

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Occupational Skills

Skill	Importance	Imp (0-100)	Level	Lvl (0-100)
Mathematics	Important	67	Advanced	50
Operation and Control	Important	63	Intermediate	48
Equipment Maintenance	Important	63	Intermediate	48
Equipment Selection	Very Important	75	Intermediate	45
Operation Monitoring	Somewhat Important	46	Intermediate	40
Repairing	Somewhat Important	33	Intermediate	36
Technology Design	Somewhat Important	42	Intermediate	36
Installation	Somewhat Important	42	Intermediate	33
Quality Control Analysis	Somewhat Important	38	Intermediate	30
Operations Analysis	Somewhat Important	29	Intermediate	29
Reading Comprehension	Important	50	Intermediate	29
Monitoring	Somewhat Important	33	Intermediate	26
Troubleshooting	Somewhat Important	25	Intermediate	26
Active Learning	Not Important	21	Basic	19
Writing	Not Important	13	Basic	19
Critical Thinking	Not Important	21	Basic	19
Complex Problem Solving	Not Important	21	Basic	18
Active Listening	Not Important	13	Basic	17
Learning Strategies	Not Important	13	Basic	17
Judgment and Decision Making	Not Important	8	Basic	14
Science	Not Important	16	Basic	14
Systems Evaluation	Not Important	8	Basic	13
Speaking	Not Important	4	Basic	12
Coordination	Not Important	8	Basic	12
Systems Analysis	Not Important	5	Basic	10
Time Management	Not Important	13	Basic	9
Management of Material Resources	Not Important	4	Basic	7
Negotiation	Not Important	4	Basic	5
Instructing	Not Important	4	Basic	5
Management of Personnel Resources	Not Important	0	Basic	2
Social Perceptiveness	Not Important	0	Basic	2
Management of Financial Resources	Not Important	0	Basic	2
Programming	Not Important	0	Basic	0
Service Orientation	Not Important	0	Basic	0
Persuasion	Not Important	0	Basic	0

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Occupational Abilities

Ability	Importance	Imp (0-100)	Level	Lvl (0-100)
Control Precision	Important	50	Intermediate	46
Information Ordering	Important	50	Intermediate	40
Static Strength	Somewhat Important	40	Intermediate	37
Written Comprehension	Important	50	Intermediate	37
Manual Dexterity	Somewhat Important	45	Intermediate	34
Wrist-Finger Speed	Somewhat Important	40	Intermediate	34
Visualization	Somewhat Important	45	Intermediate	34
Reaction Time	Somewhat Important	35	Intermediate	31
Mathematical Reasoning	Somewhat Important	30	Intermediate	31
Number Facility	Important	55	Intermediate	31
Problem Sensitivity	Somewhat Important	45	Intermediate	31
Finger Dexterity	Somewhat Important	40	Intermediate	29
Selective Attention	Not Important	20	Intermediate	29
Oral Comprehension	Not Important	10	Intermediate	29
Deductive Reasoning	Somewhat Important	35	Intermediate	29
Auditory Attention	Not Important	10	Intermediate	26
Extent Flexibility	Somewhat Important	25	Intermediate	26
Multilimb Coordination	Somewhat Important	35	Intermediate	26
Near Vision	Somewhat Important	25	Intermediate	26
Arm-Hand Steadiness	Somewhat Important	35	Intermediate	26
Inductive Reasoning	Somewhat Important	30	Basic	23
Trunk Strength	Somewhat Important	30	Basic	23
Stamina	Not Important	15	Basic	20
Speed of Limb Movement	Somewhat Important	25	Basic	20
Gross Body Coordination	Not Important	20	Basic	20
Response Orientation	Not Important	20	Basic	20
Dynamic Strength	Somewhat Important	25	Basic	20
Rate Control	Not Important	15	Basic	20
Written Expression	Somewhat Important	30	Basic	17
Dynamic Flexibility	Not Important	15	Basic	17
Explosive Strength	Somewhat Important	25	Basic	17
Time Sharing	Not Important	20	Basic	17
Perceptual Speed	Not Important	15	Basic	14
Fluency of Ideas	Not Important	10	Basic	14
Oral Expression	Not Important	10	Basic	14
Spatial Orientation	Not Important	10	Basic	11
Originality	Not Important	15	Basic	11
Memorization	Not Important	10	Basic	11
Hearing Sensitivity	Not Important	10	Basic	11
Visual Color Discrimination	Not Important	10	Basic	9
Sound Localization	Not Important	5	Basic	9
Speech Recognition	Not Important	10	Basic	9
Speed of Closure	Not Important	5	Basic	9
Category Flexibility	Not Important	0	Basic	6
Flexibility of Closure	Not Important	5	Basic	6
Far Vision	Not Important	0	Basic	3
Speech Clarity	Not Important	10	Basic	3
Night Vision	Not Important	0	Basic	0
Peripheral Vision	Not Important	0	Basic	0
Depth Perception	Not Important	0	Basic	0
Gross Body Equilibrium	Not Important	0	Basic	0
Glare Sensitivity	Not Important	0	Basic	0

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Current Occupation

51-4041.00 - Machinists

Set up and operate a variety of machine tools to produce precision parts and instruments. Includes precision instrument makers who fabricate, modify, or repair mechanical instruments. May also fabricate and modify parts to make or repair machine tools or maintain industrial machines, applying knowledge of mechanics, shop mathematics, metal properties, layout, and machining procedures.

Occupational Knowledge

Knowledge	Importance	Imp (0-100)	Level	Lvl (0-100)
Mechanical	Very Important	85	Advanced	71
Mathematics	Important	73	Advanced	67
Engineering and Technology	Important	56	Advanced	51
Computers and Electronics	Important	53	Intermediate	42
Design	Important	50	Intermediate	40
Production and Processing	Important	51	Intermediate	40
English Language	Somewhat Important	40	Intermediate	36
Education and Training	Somewhat Important	40	Intermediate	35
Chemistry	Not Important	24	Intermediate	27
Administration and Management	Not Important	24	Basic	21
Public Safety and Security	Not Important	22	Basic	20
Physics	Not Important	16	Basic	19
Psychology	Not Important	18	Basic	15
Customer and Personal Service	Not Important	24	Basic	14
Clerical	Not Important	12	Basic	14
Foreign Language	Not Important	12	Basic	13
Transportation	Not Important	9	Basic	11
Telecommunications	Not Important	7	Basic	10
Law and Government	Not Important	8	Basic	9
Medicine and Dentistry	Not Important	5	Basic	8
Therapy and Counseling	Not Important	4	Basic	7
Building and Construction	Not Important	3	Basic	4
Sales and Marketing	Not Important	3	Basic	4
Communications and Media	Not Important	3	Basic	3
Personnel and Human Resources	Not Important	3	Basic	3
Biology	Not Important	2	Basic	2
Philosophy and Theology	Not Important	2	Basic	2
Geography	Not Important	1	Basic	2
Economics and Accounting	Not Important	2	Basic	1
History and Archeology	Not Important	1	Basic	1
Sociology and Anthropology	Not Important	1	Basic	0
Fine Arts	Not Important	0	Basic	0
Food Production	Not Important	0	Basic	0

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Occupational Skills

Skill	Importance	Imp (0-100)	Level	Lvl (0-100)
Operation Monitoring	Very Important	82	Expert	79
Operation and Control	Very Important	82	Expert	77
Equipment Selection	Very Important	77	Advanced	74
Quality Control Analysis	Important	72	Advanced	69
Equipment Maintenance	Important	70	Advanced	69
Mathematics	Very Important	78	Advanced	64
Troubleshooting	Very Important	75	Advanced	64
Reading Comprehension	Important	74	Advanced	61
Installation	Important	56	Advanced	59
Complex Problem Solving	Important	59	Advanced	59
Judgment and Decision Making	Important	61	Advanced	58
Active Learning	Important	65	Advanced	57
Critical Thinking	Important	60	Advanced	56
Coordination	Important	53	Advanced	55
Repairing	Important	65	Advanced	55
Active Listening	Important	65	Advanced	54
Technology Design	Important	54	Advanced	54
Time Management	Important	59	Advanced	52
Learning Strategies	Important	52	Intermediate	47
Speaking	Important	52	Intermediate	46
Instructing	Somewhat Important	47	Intermediate	45
Systems Analysis	Somewhat Important	48	Intermediate	45
Monitoring	Somewhat Important	49	Intermediate	44
Operations Analysis	Somewhat Important	41	Intermediate	42
Social Perceptiveness	Somewhat Important	36	Intermediate	40
Service Orientation	Somewhat Important	32	Intermediate	36
Systems Evaluation	Somewhat Important	40	Intermediate	35
Persuasion	Somewhat Important	30	Intermediate	34
Programming	Somewhat Important	33	Intermediate	32
Negotiation	Somewhat Important	31	Intermediate	30
Management of Material Resources	Somewhat Important	28	Intermediate	27
Writing	Somewhat Important	36	Intermediate	27
Science	Not Important	15	Basic	17
Management of Personnel Resources	Not Important	15	Basic	16
Management of Financial Resources	Not Important	10	Basic	12

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Occupational Abilities

Ability	Importance	Imp (0-100)	Level	Lvl (0-100)
Information Ordering	Important	72	Advanced	68
Visualization	Important	63	Advanced	61
Oral Expression	Important	56	Advanced	59
Control Precision	Important	66	Advanced	57
Oral Comprehension	Important	60	Advanced	57
Deductive Reasoning	Important	63	Advanced	57
Near Vision	Important	72	Advanced	57
Manual Dexterity	Important	56	Advanced	55
Problem Sensitivity	Very Important	88	Advanced	55
Arm-Hand Steadiness	Very Important	75	Advanced	55
Auditory Attention	Important	53	Advanced	54
Written Comprehension	Important	53	Advanced	54
Inductive Reasoning	Important	63	Advanced	54
Mathematical Reasoning	Important	66	Advanced	52
Multilimb Coordination	Important	56	Advanced	52
Hearing Sensitivity	Important	50	Advanced	52
Extent Flexibility	Somewhat Important	44	Intermediate	48
Static Strength	Somewhat Important	44	Intermediate	48
Selective Attention	Important	56	Intermediate	48
Flexibility of Closure	Somewhat Important	41	Intermediate	48
Depth Perception	Somewhat Important	47	Intermediate	46
Speech Clarity	Important	60	Intermediate	43
Written Expression	Somewhat Important	41	Intermediate	41
Category Flexibility	Somewhat Important	35	Intermediate	41
Originality	Somewhat Important	31	Intermediate	41
Rate Control	Important	53	Intermediate	41
Perceptual Speed	Somewhat Important	35	Intermediate	39
Finger Dexterity	Somewhat Important	47	Intermediate	39
Reaction Time	Somewhat Important	35	Intermediate	38
Wrist-Finger Speed	Somewhat Important	35	Intermediate	38
Fluency of Ideas	Somewhat Important	31	Intermediate	38
Time Sharing	Somewhat Important	31	Intermediate	38
Trunk Strength	Somewhat Important	44	Intermediate	38
Speech Recognition	Important	56	Intermediate	36
Speed of Closure	Somewhat Important	35	Intermediate	36
Memorization	Somewhat Important	31	Intermediate	34
Response Orientation	Somewhat Important	28	Intermediate	34
Far Vision	Somewhat Important	28	Intermediate	32
Number Facility	Somewhat Important	35	Intermediate	32
Sound Localization	Somewhat Important	25	Intermediate	29
Spatial Orientation	Somewhat Important	25	Intermediate	25
Speed of Limb Movement	Somewhat Important	25	Intermediate	25
Dynamic Strength	Not Important	22	Intermediate	25
Stamina	Not Important	22	Basic	21
Visual Color Discrimination	Not Important	19	Basic	20
Peripheral Vision	Not Important	19	Basic	18
Gross Body Coordination	Somewhat Important	25	Basic	18
Dynamic Flexibility	Not Important	13	Basic	13
Explosive Strength	Not Important	9	Basic	7
Gross Body Equilibrium	Not Important	13	Basic	7
Night Vision	Not Important	6	Basic	4
Glare Sensitivity	Not Important	3	Basic	2

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Current Occupation

51-4081.00 - Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic

Set up, operate, or tend more than one type of cutting or forming machine tool or robot.

Occupational Knowledge

Knowledge	Importance	Imp (0-100)	Level	Lvl (0-100)
Mechanical	Very Important	75	Advanced	66
Production and Processing	Important	58	Advanced	50
Mathematics	Important	53	Intermediate	46
Design	Somewhat Important	47	Intermediate	39
Engineering and Technology	Somewhat Important	38	Intermediate	38
Computers and Electronics	Somewhat Important	36	Intermediate	34
Education and Training	Somewhat Important	37	Intermediate	33
Administration and Management	Somewhat Important	39	Intermediate	32
English Language	Somewhat Important	36	Intermediate	30
Building and Construction	Not Important	21	Basic	24
Customer and Personal Service	Somewhat Important	28	Basic	22
Public Safety and Security	Somewhat Important	27	Basic	20
Chemistry	Not Important	17	Basic	20
Physics	Not Important	16	Basic	19
Psychology	Not Important	16	Basic	15
Sales and Marketing	Not Important	13	Basic	14
Clerical	Not Important	24	Basic	13
Economics and Accounting	Not Important	15	Basic	13
Personnel and Human Resources	Not Important	13	Basic	11
Law and Government	Not Important	10	Basic	9
Therapy and Counseling	Not Important	4	Basic	7
Communications and Media	Not Important	6	Basic	6
Medicine and Dentistry	Not Important	7	Basic	5
Telecommunications	Not Important	6	Basic	4
Foreign Language	Not Important	5	Basic	4
Transportation	Not Important	3	Basic	3
Philosophy and Theology	Not Important	3	Basic	3
History and Archeology	Not Important	1	Basic	2
Food Production	Not Important	1	Basic	1
Sociology and Anthropology	Not Important	1	Basic	1
Biology	Not Important	0	Basic	0
Fine Arts	Not Important	0	Basic	0
Geography	Not Important	0	Basic	0

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Occupational Skills

Skill	Importance	Imp (0-100)	Level	Lvl (0-100)
Quality Control Analysis	Very Important	85	Advanced	64
Learning Strategies	Very Important	75	Advanced	63
Troubleshooting	Very Important	76	Advanced	63
Operation Monitoring	Very Important	76	Advanced	63
Instructing	Important	68	Advanced	62
Equipment Maintenance	Very Important	77	Advanced	62
Operation and Control	Very Important	82	Advanced	60
Critical Thinking	Important	74	Advanced	59
Active Learning	Important	66	Advanced	58
Repairing	Very Important	78	Advanced	57
Coordination	Important	71	Advanced	57
Reading Comprehension	Important	58	Advanced	52
Equipment Selection	Important	63	Advanced	51
Installation	Important	61	Intermediate	49
Mathematics	Important	51	Intermediate	49
Active Listening	Important	65	Intermediate	48
Monitoring	Important	57	Intermediate	47
Writing	Somewhat Important	43	Intermediate	47
Persuasion	Somewhat Important	47	Intermediate	47
Social Perceptiveness	Somewhat Important	44	Intermediate	46
Complex Problem Solving	Important	54	Intermediate	44
Speaking	Important	50	Intermediate	42
Service Orientation	Important	56	Intermediate	39
Operations Analysis	Somewhat Important	44	Intermediate	36
Judgment and Decision Making	Somewhat Important	49	Intermediate	36
Technology Design	Somewhat Important	38	Intermediate	36
Systems Analysis	Somewhat Important	44	Intermediate	33
Time Management	Somewhat Important	42	Intermediate	33
Systems Evaluation	Somewhat Important	39	Intermediate	32
Negotiation	Somewhat Important	36	Intermediate	30
Science	Somewhat Important	26	Intermediate	29
Management of Personnel Resources	Somewhat Important	25	Intermediate	27
Management of Material Resources	Somewhat Important	27	Basic	24
Programming	Not Important	23	Basic	21
Management of Financial Resources	Not Important	12	Basic	10

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Occupational Abilities

Ability	Importance	Imp (0-100)	Level	Lvl (0-100)
Control Precision	Very Important	77	Advanced	50
Manual Dexterity	Important	70	Intermediate	47
Near Vision	Important	55	Intermediate	47
Information Ordering	Important	73	Intermediate	44
Static Strength	Important	50	Intermediate	44
Written Comprehension	Important	68	Intermediate	44
Reaction Time	Somewhat Important	43	Intermediate	41
Extent Flexibility	Important	53	Intermediate	41
Problem Sensitivity	Important	60	Intermediate	41
Visualization	Somewhat Important	45	Intermediate	40
Selective Attention	Somewhat Important	38	Intermediate	39
Perceptual Speed	Somewhat Important	45	Intermediate	37
Wrist-Finger Speed	Somewhat Important	45	Intermediate	37
Finger Dexterity	Somewhat Important	48	Intermediate	37
Time Sharing	Somewhat Important	40	Intermediate	37
Arm-Hand Steadiness	Important	50	Intermediate	37
Multilimb Coordination	Somewhat Important	48	Intermediate	36
Deductive Reasoning	Somewhat Important	48	Intermediate	36
Oral Expression	Somewhat Important	45	Intermediate	36
Visual Color Discrimination	Somewhat Important	32	Intermediate	34
Trunk Strength	Important	50	Intermediate	34
Speed of Limb Movement	Somewhat Important	43	Intermediate	33
Number Facility	Somewhat Important	45	Intermediate	33
Oral Comprehension	Somewhat Important	32	Intermediate	31
Memorization	Somewhat Important	35	Intermediate	31
Far Vision	Somewhat Important	28	Intermediate	30
Response Orientation	Somewhat Important	30	Intermediate	30
Rate Control	Somewhat Important	38	Intermediate	30
Spatial Orientation	Somewhat Important	38	Intermediate	29
Explosive Strength	Somewhat Important	35	Intermediate	29
Speed of Closure	Not Important	20	Intermediate	29
Mathematical Reasoning	Somewhat Important	40	Intermediate	27
Written Expression	Somewhat Important	30	Intermediate	26
Auditory Attention	Not Important	22	Intermediate	26
Category Flexibility	Somewhat Important	28	Intermediate	26
Gross Body Coordination	Somewhat Important	30	Intermediate	26
Depth Perception	Somewhat Important	30	Intermediate	26
Flexibility of Closure	Not Important	20	Intermediate	26
Hearing Sensitivity	Not Important	20	Intermediate	26
Dynamic Flexibility	Somewhat Important	28	Basic	24
Dynamic Strength	Somewhat Important	28	Basic	24
Inductive Reasoning	Somewhat Important	35	Basic	24
Stamina	Somewhat Important	30	Basic	23
Speech Clarity	Somewhat Important	28	Basic	23
Gross Body Equilibrium	Not Important	18	Basic	23
Fluency of Ideas	Not Important	22	Basic	21
Originality	Somewhat Important	25	Basic	20
Sound Localization	Not Important	10	Basic	17
Speech Recognition	Not Important	20	Basic	17
Peripheral Vision	Not Important	20	Basic	17
Glare Sensitivity	Not Important	8	Basic	13
Night Vision	Not Important	5	Basic	11

Source: U.S. Department of Labor / Employment and Training Administration, O*NET database version 11.

Machine Tool Technology Program Assessment Plan

As of December 2008 the machine Tool Technology program has not prepared or submitted a plan for the on-going assessment of student learning. This is in violation of requirements established by the Student Outcomes Assessment Committee (SOAC) and affirmed by the Chancellor's Cabinet.

Lack of compliance to this requirement has direct negative implications for the College's accreditation status with the Higher Learning Commission (HLC) of the North Central Association (NCA).

**Machine Tool - Numerical Control Technology
Program Assessment Plan**

Last Revised 9/28/2005

Statement of Purpose

To prepare students for careers in industry or update students' skills for an existing career. Students are provided with both a theoretical and practical knowledge base. The specific goal is to graduate competent technicians in CNC technology and operations.

Machine Tool - Numerical Control Technology Program Assessment Plan

Learning Outcome

Students will produce "art-to-part" CAD/CAM models on the CNC machines.

Benchmark	Assessment Method	Assessment Date
514.1A 90% of students will properly program the machines to complete the CAD/CAM-generated model.	In ATM 2200 and ATM 2300, Art to Part Final Project, students complete the art to part process.	5/1/2008

Machine Tool - Numerical Control Technology Program Assessment Plan

Learning Outcome

Students will develop oral and written technical communications skills.

Benchmark	Assessment Method	Assessment Date
514.2A All students complete a workbook of written manuscripts for projects in ATM 1300.	Students will achieve 80% in evaluation by faculty against technical writing standards.	5/1/2008
514.2B Students will lead the group in demonstrations on equipment they have operated.	Students will average 80% in evaluation by classmates on presentation clarity.	5/1/2008

Machine Tool - Numerical Control Technology Program Assessment Plan

Learning Outcome

Students will master problem analysis and solving skills in order to complete assigned designs.

Benchmark	Assessment Method	Assessment Date
514.3A All graduates will complete Technical Math courses.	No assessment method indicated	
514.3B Students successfully apply problem-solving techniques to assigned CNC projects.	100% of students successfully trouble-shoot and correct for problems built into their CNC projects.	5/1/2008

Machine Tool - Numerical Control Technology Program Assessment Plan

Learning Outcome

Students will integrate theory, practical skills, and knowledge of specifications and equipment operations to complete final exam calculations and list details of machine set up.

Benchmark	Assessment Method	Assessment Date
514.4A 85% of the students will be able to perform the necessary trigonometry and write a manuscript for a Bridgeport milling machine from the information provided in a standard blueprint.	Blueprint details and machining manuscripts will be completed on the final examination with 75% accuracy.	6/1/2008
514.4B In above progressive assignment, a sampling of labs measure the following: Equipment set up and performance on tapering, grinding, threading, tapping, reaming, facing according to specifications with 85% efficiency. 90% of students successfully complete the measures.	On the specifics of the vise assignment, 90% of the students will produce pieces that will assemble and operate smoothly. The finished part (vise) performs intended function.	5/1/2008

Machine Tool - Numerical Control Technology Program Assessment Plan

Learning Outcome

Students develop skills in appropriate machine use for safety and accuracy.

Benchmark	Assessment Method	Assessment Date
514.5A Students will learn the proper procedures required to set up the machinery and equipment to perform multiple tooling operations with 97% accuracy. (This item sets the standard for the safety of the student and others within the lab so accuracy is much more critical). Students will calculate speed and feed rates appropriate to the materials being machined with 85% accuracy. 90% of students successfully complete the measures.	In the progressive assignment (ATM 1100, 1120, 1140 and 1180) students must simultaneously meet the criteria for this benchmark. Assessment includes proper equipment set up, application of safety precautions, determination of feed and speed rates, and their performance on tapering, grinding, threading, tapping, reaming, facing.	5/1/2008
514.5B Equal number of appendages at end of program as at start of program.	No method indicated.	5/1/2008

Summary of Program Assessment Findings

7/1/2007 to 6/30/2008

Statement of Purpose

Within this timeframe:

- 0 Benchmarks were scheduled to be assessed**
- 0 Benchmarks were assessed**
- 0 Benchmarks were not assessed**

Note: The following pages reflect findings for those Benchmarks that were assessed.



**OAKLAND
COMMUNITY
COLLEGE**

Curriculum Review Committee Recommendations

Machine Tool Technology

Steve Atma

March 20, 2009

The Machine Tool program is aware of the downturn of this industry and is in the process of redesign in order to be current and prepared to meet the potential needs of business in the future.

Curriculum

- Machine Tool faculty and the Technology Dean need to develop a current advisory committee to assist in the redesigning of the program. Possible consideration is an Advance Manufacturing program.
- As part of the redesigning the faculty, department chair, and dean will continue to work on developing a Computer Numerical Control Certificate of Achievement (CNC CA) which will feed into the present Computer Numerical Control Certificate (CNC. CT)
- Consider placing the redesigned Certificate of Achievement and Certificate under the new Technology degree.
- Continue to work with the Math discipline about an applied math course.
- Work with Counseling/Access /ASC to identify students with reading needs and assist in appropriate support.
- Develop a student survey with IR and the Technology Dean understand why students are withdrawing from classes.
- Consider grant funded training courses in CNC to move students into CNC .CA or CNC.CT.