

# CNC MACHINE PROGRAMMER / OPERATOR

Delta College Associate Degree In Applied Science (Code AAS 15862)  
Advanced Certificate (Code CT 35863)

**Effective  
2001 / 02  
Catalog**

As a CNC Machine Tool Programmer/Operator, you will use computer driven machine tools such as lathes, mills, profilers, lasers, water jet, wire electrical discharge machines, tube benders, punches, and grinders to shape metals to precise dimension. Although some programmer/operators can work with a wide variety of CNC machine tools, most specialize in one or two types. Specific duties may include: studying blueprints, sketches; tool, fixture and machine setup; programming and editing; machine work pieces; inspecting, verifying, and certifying product for dimensional accuracy; light duty repair and maintenance of the CNC machine.

**General Education Courses**

Dept/Cat #	Completed	Course Title	Sem/Cr Hrs
ENG	___	Any Approved College Composition 1 Course . . . . .	3/5
ENG 113	___	Technical Communications . . . . .	3
LW	___	Any approved Lifelong Wellness Requirement. . . . .	1
LW 220	___	Lifelong Wellness . . . . .	1
POL	___	Any Approved American Government Requirement . . . . .	3/4
PSY 101 OR	___	Applied Psychology OR	
SPH 112 OR	___	Fundamentals of Oral Communication OR	
SPH 114	___	Interpersonal Communications . . . . .	3
		<b>SUBTOTAL</b>	<b>14/17</b>

**Basic Program Requirements:**

> CAD 114	___	AutoCad Introduction . . . . .	2
> CST 103 OR	___	Windows Foundations OR	
CST 106	___	Internet Foundations . . . . .	1
> CNC 160	___	Computer Numerical Control Programming I. . . . .	3
> CNC 201	___	CNC Tooling and Special Setups . . . . .	2
CNC 284	___	CNC Practicum . . . . .	4
> DRF 104 OR	___	Basic Mechanical Design OR	
DRF 105	___	Beginning Mechanical Design. . . . .	4/3
> MS 103	___	Machine Shop III. . . . .	4
> MS 104	___	Machine Shop IV . . . . .	4
> MS 112	___	Ferrous Heat Treatment . . . . .	2
> MS 120	___	Machinist's Handbook . . . . .	2
> MT 110	___	Machine Tool Calculations . . . . .	4
		<b>SUBTOTAL</b>	<b>31/32</b>

- > If you are an Associate degree candidate, you must select five courses from the CNC Core.  
(Three must be from the On-Line Programming Group and two must be from the Off-Line Programming Group.) . . . . . 24
- > If you are a Certificate candidate, you must select four courses from the CNC Core.  
(Three must be from the On-Line Programming Group) . . . . . 16

**CORE COURSES:****ON-LINE PROGRAMMING**

Beginning	Advanced	Programming/Operation	
CNC 210	CNC 250	Hass Turning Center. . . . .	4
CNC 212	CNC 252	Heidenhain TNC-151 Control. . . . .	4
CNC 213	CNC 253	OSP-5000 LG Control . . . . .	4
CNC 214	CNC 254	Anilam G EIA/ISO Control. . . . .	4
CNC 216	CNC 256	Mazatrol M-2 Control . . . . .	4
CNC 217	CNC 257	JAPT 3J EIA/ISO Control . . . . .	4
CNC 218	CNC 258	Boston Digital SPC-II EIA/ISO . . . . .	4
CNC 219	CNC 259	Hass Machining Center . . . . .	4

**OFF-LINE PROGRAMMING**

Beginning	Advanced		
CNC 221	CNC 261	SUFCAM . . . . .	4
CNC 223	CNC 263	TM-APT-GL . . . . .	4
CNC 225	CNC 265	Mastercam. . . . .	4
CNC 226	CNC 266	CAM M-2/M-32. . . . .	4
CNC 230	CNC 270	ACU. CARV . . . . .	4

**TOTAL CREDITS REQUIRED FOR CERTIFICATE 43/44**  
**TOTAL CREDITS REQUIRED FOR ASSOCIATE DEGREE 69/73**

**Technical electives suggested for enrichment:**

IS 110	Industrial Supervision . . . . .	3
MT 220	Introduction to Fluid Power . . . . .	3

- > **CERTIFICATE OPTION:** A Certificate will be awarded when you successfully complete courses preceded by a "greater than" sign ">" (43/44 Sem Hrs.)

**NOTATIONS:**

1. This is primarily an evening program. For details see a counselor, academic advisor or instructor.
2. See page 98 of 2001-02 college catalog for graduation requirements.
3. Delta College reserves the right to modify program requirements.

EFFECTIVE FALL 1988 SEMESTER, ALL ENTERING STUDENTS (THOSE WITH NO PRIOR DELTA CREDITS) MUST COMPLETE 6 CREDIT HOURS OF "WRITING ACROSS THE CURRICULUM" COURSES TO FULFILL GRADUATION REQUIREMENTS. Students with previously earned degrees from an accredited college are exempt from this policy.

"THE GRADUATION AUDIT WILL BE IN COMPLIANCE WITH THE GUIDELINES IDENTIFIED IN THE COLLEGE CATALOG".



## COMPUTER NUMERICAL CONTROL TECHNOLOGY

### NATURE OF WORK

CNC Machine Tool Programmer/Operators use computer-driven machine tools, such as lathes, mills, profilers, lasers, water jet, wire electrical discharge machines, tube benders, punches, and grinders to shape metals to precise dimensions. Although some programmer/operators can work with a wide variety of CNC machine tools, most specialize in one or two types. Specific duties may include: studying blueprints, sketches; tool, fixture and machine set up; programming and editing, machining work pieces; inspecting, verifying, and certifying product for dimensional accuracy; light duty repair and maintenance of the CNC machine.

### PLACES OF EMPLOYMENT

Nationwide, more than 6,900 numerical control tool operators were employed in 1996. Most work in factories that produce fabricated metal products, transportation equipment and machinery in large quantities. Machine tool operators work in every state and in almost every city in the United States. The majority, however, are concentrated in the Great Lakes region. About one-fourth of machine tool operators work in the cities of Detroit, Flint, Chicago, Cleveland, and Milwaukee. Also, there is a large concentration in Los Angeles, Philadelphia, St. Louis and Indianapolis.

### TRAINING, OTHER QUALIFICATIONS AND ADVANCEMENT

Many CNC machine tool programmer/operators learn their skills on the job. Trainees may be supervised by more experienced programmer/operators; or if the CNC machine tool is new in the shop, the programmer/operator must learn the control and machine through the "college of hard knocks." People who come in with experience or prior academic training save the employer training time, machine down-time, and money. CNC machining requires the programmer/operator to have solid grip on the basics of manual machine tool operations, blueprint reading, algebra, trigonometry, geometry, and critical thinking. Sharp CNC machine tool programmer/operators may advance to positions such as foreman, quality assurance manager, trainer, or superintendent.

### EMPLOYMENT OUTLOOK

Nationally, employment of numerical control tool operators is expected to increase faster than the average for all occupations through the year 2007. In Michigan, employment is expected to grow much faster than average through 2006. An average of 340 yearly openings is expected. The demand for workers depends on economic conditions of related industries, as well as replacement of workers who leave the labor force. Local job shops contributed a great portion of the funding for the CNC lab. In other areas around the country, there is great demand for CNC machine tool programmer/operators and positions in related fields, such as sales, design, building, installation, and teaching. The people who will do the best in the future are those with thorough knowledge of the basics as mentioned above.

### EARNINGS AND WORKING CONDITIONS

Nationally, Computer Numerically Controlled machine tool programmers had an average hourly earning from \$13.00 to \$20.00 in 1999, with In Michigan, average hourly wages in late 1999 ranged from \$116.57 to \$18.36. Machinists generally work in shops that are well heated, ventilated, dust-free, and well lighted. There is grease, oil and coolants in and around machine tools, and the shops are usually noisy. Safety gear is required to reduce injury from hazards, such as flying metal chips. Many machine shops require machinists to provide their own hand tools. Cost ranges from \$300 to \$1,500 depending upon quality purchased.

### SOURCES OF ADDITIONAL INFORMATION

1. Delta's Career & Employment Services  
Lower Level East Concourse  
(989) 686-9072 – <http://www.delta.edu/~jobplace>
2. Delta's Counseling Center – D 102  
(989) 686-9330 - <http://www.delta.edu/~counsel/>
3. National Tooling & Machining Association  
9300 Livingston Road  
Ft. Washington, MD 20744  
1-301-248-6200  
<http://www.ntma.org>
4. Society of Manufacturing Engineers  
One SME Drive  
P.O. Box 930  
Dearborn, MI 48121  
<http://www.sme.org>